

## Daniel P. Becker, Ph.D.

Department of Chemistry & Biochemistry  
Loyola University Chicago, 1068 W Sheridan Rd, Chicago, IL 60660  
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### EDUCATION

Ph.D. in Chemistry, Indiana University, Bloomington, IN Research Advisor: Professor Philip D. Magnus, F.R.S. <i>Studies of the Pauson-Khand Reaction: Progress toward the Synthesis of (+)-6a-Car-baprostaglandin I<sub>2</sub>. Deprotonation of Hexacarbonyl (trimethylsilylethyne)-dicobalt.</i>	1982 - 1986
B.A. in Chemistry, Kalamazoo College, Kalamazoo, MI	1978 - 1982
Friedreich Alexander Universität Erlangen-Nürnberg, Germany	1980 - 1981

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### ACADEMIC EXPERIENCE

Professor of Chemistry Loyola University, Chicago, IL	2016-present
Associate Professor of Chemistry Loyola University, Chicago, IL	2008-2016
Adjunct Associate Professor, Department of Microbiology and Immunology Loyola University Medical Center, Maywood, IL	2005-2016
Associate Professor, Organic & Medicinal Chemistry (tenure track) Loyola University, Chicago, IL	2004-2008
Adjunct Associate Professor of Medicinal Chemistry The University of Illinois at Chicago, Chicago, IL	1993 - 2016

### INDUSTRIAL RESEARCH EXPERIENCE

Consultant to Pharmaceutical/Biotech, Intellectual Property Firms, and U. of Chicago	2003-present
<ul style="list-style-type: none"><li>Advise companies on medicinal chemistry approaches, product development, sustainable development strategies, and intellectual property.</li></ul>	
Senior Research Advisor & Research Fellow Pharmacia Corporation, Skokie, IL	2002-2003
<ul style="list-style-type: none"><li>Project leader for matrix metalloproteinase (MMP) project responsible for leading design, synthesis and development of drugs to treat cancer, arthritis, and cardiovascular diseases resulting in clinical candidates SD-2590 and SD-7300. Directly responsible for international team of 24 Ph.D./B.S./M.S. medicinal chemists and coordination with biology, pharmaceuticals, tox, development, and legal.</li></ul>	

- Senior Research Scientist and Group Leader  
G.D. Searle & Co., Skokie, IL 1996 - 2002
- Led research group of M.S. and Ph.D. medicinal chemists in design and synthesis of novel small molecule MMP inhibitors for the treatment of cancer, arthritis and cardiovascular diseases.
- Research Scientist I, Department of Medicinal Chemistry  
G.D. Searle & Co., Skokie, IL 1992 - 1995
- Led group of M.S. level scientists in the design and synthesis of novel CMV Assemblin Protease inhibitors as antivirals to treat infections in the herpes virus family including CMV and VZV.
- Senior Research Investigator, Gastrointestinal Diseases Research  
G.D. Searle & Co., Skokie, IL. 1989 - 1992
- Led group of M.S. level scientists in the design and synthesis of novel 5-HT<sub>4</sub> agonists and 5-HT<sub>3</sub> antagonists for the treatment of gastrointestinal diseases including GERD and IBD.
- Research Investigator, Gastrointestinal Diseases Research  
G.D. Searle & Co., Skokie, IL. 1987 - 1989
- Directly responsible for the design and synthesis of novel medicinal agents for the treatment of gastrointestinal diseases including GERD and IBD.
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## PROFESSIONAL ACTIVITIES

### Peer Review Committees

- 2020 NIH Study Section: Biological Chemistry and Macromolecular Biophysics (BCMB) ad hoc  
2019 NIH Study Section: Biological Chemistry and Macromolecular Biophysics (BCMB) ad hoc  
2017 NIH Study Section: Biological Chemistry and Macromolecular Biophysics (BCMB) ad hoc  
2016 NIH Study Section: Brain Disorders and Clinical Neuroscience ad hoc  
2014 NIH Study Section: Molecular Probes  
2014 NIH Study Section: Drug Discovery for the Nervous System  
2013 NIH Study Section: Drug Discovery for the Nervous System  
2013 NIH Study Section: Molecular Probes  
2012 NIH Study Section: Drug Discovery for the Nervous System  
2012 NIH Study Section: Molecular Probes  
2012 ACS PRF Ad hoc reviewer  
2010 Ad hoc reviewer Czech Science Foundation (GA CR),  
2010 ACS PRF Ad hoc reviewer  
2009 PRF Ad hoc reviewer  
2008 ACS PRF Ad hoc reviewer

**Journal Reviewer:** ACS PRF, Czech Science Foundation (GA CR), JACS, J Med Chem, JOC, Bioorganic & Medicinal Chemistry Letters, Organic Letters, Tetrahedron, Tetrahedron Letters, European Journal of Medicinal Chemistry, Chemical Biology & Drug Design, Expert Opinion in Therapeutic Patents, Bioinorganic Chemistry and Applications, Synthesis, Monatshefte, Current Organic Chemistry, Catalysis Today, SYNLETT, and the Organic Synthesis section of the journal Molecules.

**Member:** The American Chemical Society (ACS) Divisions of Organic Chemistry and Medicinal Chemistry

## PROFESSIONAL AWARDS

- Loyola University Sujack Master Teacher Award 2020
- Nominated for St. Ignatius of Loyola Excellence in Teaching Award 2019
- Nominated for Provost's Award for Excellence in Teaching Freshmen 2019
- Nominated for the Langerbeck Faculty Mentor Award 2019
- Loyola University Alice B. Hayes Award for Advising and Mentoring 2015
- Nominated for Sujack Award for Excellence in Teaching 2008
- NRHH Loyola University Chicago Teacher of the Month 2007
- Certificate of Recognition for Excellence in Teaching, Mentoring, and Advising 2006
- Research Fellow, Pharmacia Corporation, Skokie, IL 2002
- Field Museum Education Curriculum Steering Committee 1999
- DuPont Associate Instructor Award for Excellence in Teaching, Indiana University 1984
- Comprehensive Examinations in Chemistry: Passed with Distinction, Kalamazoo College 1982
- German Language Fluency Examination, Kalamazoo College: 800/800 1981

## BOOK CHAPTERS

1. Daniel P. Becker, Bella Goldstin, Gary W. Gullikson, Richard Loeffler, Alan Moormann, Chaffiq Moumami, Roger Nosal, Dale Spangler, Clara I. Villamil, Dai-C. Yang, Daniel L. Zabrowski, and Daniel L. Flynn, "Design and Synthesis of Agonists and Antagonists of the Serotonin 5-HT<sub>4</sub> Receptor Subtype", in "Perspectives in Receptor Research", ed. D. Giardina et. al., *Pharmacochimistry Library, Vol. 24*, Elsevier Science B. V.: Amsterdam, **1996**, pp. 99-120.
2. Qian Wang, Marlon Lutz, Matthew Reichert, Daniel Becker, and M. Paul Chiarelli, "New Analytical Approaches for the Detection of Micropollutants in Natural Waters: Identification of 3,5-Dichloro-4-phenolsulfonic acid as an unknown persistent pollutant.", in "Surface Water Photochemistry", ed. Paola Calz and Davide Vione, The Royal Society of Chemistry, **2015**.

## PUBLICATIONS

1. Philip Magnus and Daniel P. Becker, "Deprotonation of Hexacarbonyl (trimethylsilylethyne) dicobalt and Subsequent Single Electron Transfer Chemistry, Polyacetylene-Poly (cobaltcarbonyl) complexes," *J. Chem. Soc. Chem. Commun.* **1985**, 640.
2. Philip Magnus and Daniel P. Becker, "Stereospecific Dicobalt Octacarbonyl Mediated Enyne Cyclization for the Enantiospecific Synthesis of a 6a-Carbocycline Analogue", *J. Am. Chem. Soc.* **1987**, 109, 7495.
3. D. Becker, P. Carter, J. Elliott, R. Lewis, P.D. Magnus, F.R.S., L. Principe and M. Slater, "Organometallic Chemistry can Simplify the Synthesis of Important Biologically Active Natural Products", *Phil. Trans. Royal Soc. Lond. A* **1988**, 326, 641.
4. Daniel L. Flynn, Daniel P. Becker, Roger Nosal, Clara I. Villamil, Daniel L. Zabrowski, Gary W. Gullikson, Chafiq Moumami, and Dai Yang, "SC-53116: The First Selective Agonist at the Newly Identified Serotonin 5-HT<sub>4</sub> Receptor Subtype", *J. Med. Chem.* **1992**, 35, 1486.
5. Daniel L. Flynn, Clara I. Villamil, Daniel P. Becker, Gary W. Gullikson, Chafiq Moumami, and Dai-Chang Yang, "1,3,4-Trisubstituted Pyrrolidinones as Scaffolds for Construction of Peptidomimetic Cholecystokinin Antagonists," *Bioorg. and Med. Chem. Lett.* **1992**, 2, 1251-1256.

6. Daniel P. Becker and Daniel L. Flynn, "A Short Synthesis of 1-Azaadamantan-4-one and the 4r and 4s Isomers of 4-Amino-1-azaadamantane", *Synthesis* **1992**, 1080.
7. Daniel L. Flynn, Daniel P. Becker, Roger Nosal, and Daniel L. Zabrowski, "Use of Atom-transfer Radical Cyclizations as an Efficient Entry into a New Serotonergic Norazaadamantane", *Tetrahedron Lett.* **1992**, *33*, 7283.
8. Daniel L. Flynn, Daniel P. Becker, Roger Nosal, Gary Gullikson, Chafiq Moumami, Dai-Chang Yang, and Dale P. Spangler, "New (Nor)Aza-Adamantanes Are Agonists at the Newly Identified Serotonin 5HT4 Receptor and Antagonists at the 5HT3 Receptor", *Bioorg. Med. Chem. Lett.* **1992**, *2*, 1613.
9. Daniel P. Becker, Patricia M. Finnegan, and Paul W. Collins, "Isolation of a Highly Functionalized Troeger's Base Derivative via a Novel Reaction", *Tetrahedron Lett.* **1993**, *34*, 1889.
10. Daniel P. Becker and Daniel L. Flynn, "Studies of the Solid-Phase Pauson-Khand Reaction Selective in-situ Enone Reduction to 3-Azabicyclo[3.3.0]octanones", *Tetrahedron Lett.* **1993**, *34*, 2087.
11. Daniel P. Becker and Daniel L. Flynn, "Synthesis of N-BOC-3-Azabicyclo[3.3.0]octan-7-one via Reductive Pauson-Khand Cyclization and Subsequent Conversion to a Novel Diazatricyclic Ring System", *Tetrahedron*, **1993**, *49*, 5047.
12. Daniel Becker and Daniel Flynn, "Preparation of Trifluoromethyl Lactol Derivatives via Base-Initiated Cyclobutanol Ring-Opening to a Laterally-Lithiated Trifluoromethyl Ketone", *Synlett.*, **1996**, 57.
13. Daniel P. Becker, Hui Li, and Daniel L. Flynn, "One-Pot Preparation of 1,3-Dihydro-1-(Trifluoromethyl)isobenzofuran-1-ol Derivatives from 1,2-Dibromobenzene", *Synthetic Communications*, **1996**, *26*, 3127-35.
14. Daniel P. Becker, Roger Nosal, Daniel L. Zabrowski and Daniel L. Flynn, "Synthetic Strategies for the Construction of Enantiomeric Azanoradamantanes", *Tetrahedron*, **1997**, *53*, 1-20.
15. Daniel L. Flynn, Daniel P. Becker, Alan Moormann, Clara Villamil, Kathryn Houseman, Art Wittwer, Leanna Levine, M. Toth, Paul Hippenmeyer, Vickie Dilworth, Maureen Highkin, Anne Rankin and Barry Holwerda, "The Herpesvirus Protease: Mechanistic Studies and Discovery of Inhibitors of the Human Cytomegalovirus Protease" *Drug Design & Discovery*, **1997**, *15*, 3-15.
16. Daniel P. Becker, Roger Nosal, Clara I. Villamil, Gary Gullikson, Chafiq Moumami, Dai-Chang Yang and Daniel L. Flynn, "Serotonin 5-HT4 Agonist Activity of a Series of Meso-Azanoradamantane Benzamides", *Bioorganic & Medicinal Chemistry Letters*, **1997**, *7*, 2149-2154.
17. Daniel P. Becker, Robert K. Husa, Alan E. Moormann, Clara I. Villamil, Daniel L. Flynn, "Enantioselective Synthesis of Dual 5-HT3/5-HT4 Serotonergic Azanoradamantane SC-52491", *Tetrahedron*, **1999**, *55*, 11787-11802.
18. Thomas E. Barta, Daniel P. Becker, Louis J. Bedell, Gary A. DeCrescenzo, Joseph J. McDonald, Grace E. Munie, Shashi Rao, Huey-Sheng Shieh, Roderick Stegeman, Anna M. Stevens and Clara I. Villamil, "Synthesis and Activity of Selective MMP Inhibitors with an Aryl Backbone", *Bioorganic & Medicinal Chemistry Letters*, **2000**, *10*, 2815-2817.
19. Thomas E. Barta, Daniel P. Becker, Louis J. Bedell, Gary A. DeCrescenzo, Joseph J. McDonald, Pramod Mehta, Grace E. Munie and Clara I. Villamil, "Selective, Orally Active MMP Inhibitors with an Aryl Backbone" , *Bioorganic & Medicinal Chemistry Letters*, **2001**, *11*, 2481-2483.

20. Daniel P. Becker, Thomas E. Barta, Louis Bedell, Gary DeCrescenzo, John Freskos, Daniel P. Getman, Susan L. Hockerman, Madeleine Li, Pramod Mehta, Brent Mischke, Grace Munie, Craig Swearingen, Clara I. Villamil, " $\alpha$ -Amino- $\beta$ -Sulphone Hydroxamates as Potent MMP-13 Inhibitors That Spare MMP-1", *Bioorganic & Medicinal Chemistry Letters*, **2001**, *11*, 2719-2722.
21. Daniel P. Becker, Gary DeCrescenzo, John Freskos, Daniel P. Getman, Susan L. Hockerman, Madeleine Li, Pramod Mehta, Grace Munie, Craig Swearingen, " $\alpha$ -Alkyl- $\alpha$ -Amino- $\beta$ -Sulphone Hydroxamates as Potent MMP Inhibitors That Spare MMP-1", *Bioorganic & Medicinal Chemistry Letters*, **2001**, *11*, 2723-2725.
22. Daniel P. Becker, Daniel L. Flynn, Clara I. Villamil, "Bridgehead-Methyl SC-53116 as a 5-HT4 Agonist", *Bioorganic & Medicinal Chemistry Letters*, **2004**, *14*, 3073-3075. PMID: 15149647.
23. Daniel P. Becker, Daniel L. Flynn, Robert Shone and Gary Gullikson, "Azaadamantane Benzamide 5-HT4 Agonists: Gastrointestinal Prokinetic SC-54750", *Bioorganic & Medicinal Chemistry Letters*, **2004**, *14*, 5509-5512. PMID: 15482914.
24. Daniel P. Becker, Clara I. Villamil, Thomas E. Barta, Louis J. Bedell, Terri L. Boehm, Gary A. DeCrescenzo, John N. Freskos, Daniel P. Getman, Susan Hockerman, Robert Heintz, Susan Carol Howard, Madeleine H. Li, Joseph J. McDonald, Chris P. Carron, Chris L. Funckes-Shippy, Pramod P. Mehta, Grace E. Munie and Craig A. Swearingen. "Synthesis and Structure-Activity Relationships of  $\beta$ - and  $\alpha$ -Piperidine Sulphone Hydroxamic Acid Matrix Metalloproteinase Inhibitors with Oral Antitumor Efficacy", *J. Med. Chem.* **2005**, *48*, 6713-6730. PMID: 16220987.
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26. Lutz Jr., Marlon R., French, David C., Rehage, Peter, & Becker, Daniel P. "Isolation of the saddle and crown conformers of cyclotrimeratrylene (CTV) oxime", *Tetrahedron Lett.* **2007**, *48*, 6368-6371.
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28. Lutz Jr., Marlon R., Zeller, Matthias; Becker, Daniel P. "2,3,5',6,6',7-Hexamethoxy-3'H,10H-spiro[anthracene-9,1'-isobenzofuran]-3',10-dione", *Acta Cryst.* **2007**, *63* o4390-o4391.
29. Armoush, Nicola; Kataria, Preeti; Becker, Daniel P. "Synthesis of Substituted 2-Amino-Cyclobutanones", *Synthetic Communications* **2008**, *38*(11), 1679-1687.
30. Lutz Jr., Marlon R.; Zeller, Matthias; Becker, Daniel P. "Beckmann Rearrangement of Cyclotrimeratrylene (CTV) Oxime: Tandem Beckmann-Electrophilic Aromatic Addition", *Tetrahedron Letters* **2008**, *49*, 5003-5005.
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32. French, David; Lutz, Marlon R.; Lu, Chichi; Zeller, Matthias; Becker, Daniel P. "A Thermodynamic and Kinetic Characterization of the Solvent Dependence of the Saddle-Crown Equilibrium of

Cyclotrimeratrylene (CTV) Oxime, *J. Phys. Chem A.*, **2009**, *113*, 8258-8267.  
<http://pubs.acs.org/doi/abs/10.1021/jp901796z> PMID: 19569660

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<http://www.sciencedirect.com/science/article/pii/S0960894X09013456> PMID: 19822427
34. Hamed, Othman; Henry, Patrick; Becker, Daniel P. "Palladium(II)-Catalyzed Dicarboxymethylation of Chiral Allylic Alcohols: Chirality Transfer Affording Optically Active Diesters Containing Three Contiguous Chiral Centers" *Tetrahedron Lett.*, **2010**, *51*, 3514-3517.
35. Stephen A. Kolodziej, Susan L. Hockerman, Gary A. DeCrescenzo, Joseph J. McDonald, Debbie A. Mischke, Grace E. Munie, Theresa R. Fletcher, Nathan W. Stehle, Craig Swearingen and Daniel P. Becker "MMP-13 Selective Isonipecotamide  $\alpha$ -Sulfone Hydroxamates" *Bioorganic & Medicinal Chemistry Letters*, **2010**, *20* 3561-3564.  
<http://www.sciencedirect.com/science/article/pii/S0960894X10005895> PMID: 20529685
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<http://www.sciencedirect.com/science/article/pii/S0960894X10006086> PMID: 20529684.
37. Daniel P. Becker, Thomas Barta, Louis Bedell, Terri Boehm, Brian Bond, Jeffery Carroll, Chris Carron, Gary DeCrescenzo, Alan Easton, John Freskos, Chris Funckes-Shippy, Marcia Heron, Susan Hockerman, Susan Carol Howard, James R. Kiefer, Madeleine Li, Karl Mathis, Joseph J. McDonald, Pramod P. Mehta, Grace Munie, Teresa Sunyer, Craig Swearingen, Clara Villamil, Dean Welsch, Jennifer Williams, Jun Yao, Ying Yu "Orally-Active MMP-1 Sparing  $\alpha$ -Tetrahydropyranyl and  $\alpha$ -Piperidinyl Sulfone Matrix Metalloproteinase (MMP) Inhibitors with Efficacy in Cancer, Arthritis, and Cardiovascular Disease" *Journal of Medicinal Chemistry*, **2010** *53* 6653-6680. *Highlighted in SciBX: Science-Business eXchange September 2, 2010, Volume 3, number 34.* PMID: 20726512
38. Panagopoulos, Andria; Zeller, Matthias; Becker, Daniel P. "Synthesis of an ortho-Triazacyclophane, N,N',N"-Trimethyltribenzo-1,4,7-triazacyclononatriene" *J. Org. Chem.* **2010** *75*, 7887-7892.  
<http://pubs.acs.org/doi/abs/10.1021/jo1017074> PMID: 20973522.
39. Barta, Thomas E.; Becker, Daniel P.; Bedell, Louis J.; Easton, Alan M.; Hockerman, Susan L.; Kiefer, James; Munie, Grace E.; Mathis, Karl J.; Li, Madeleine H.; Rico, Joseph G.; Villamil, Clara I.; Williams, Jennifer M. "MMP-13 Selective  $\alpha$ -Sulfone Hydroxamates: A Survey of P1' Heterocyclic Amide Isosteres" *Bioorganic & Medicinal Chemistry Letters*, **2011**, *21* 2820-2822. PMID: 21507637.
40. Fobian, Yvette; Freskos, John N.; Barta, Thomas E.; Heintz, Robert; Kiefer, James R.; Mischke, Brent V.; Mullins, Patrick; Munie, Grace E.; Becker, Daniel P. "MMP-13 Selective  $\alpha$ -Sulfone Hydroxamates Identification of selective P1' Amides" *Bioorganic & Medicinal Chemistry Letters*, **2011**, *21* 2823-2825. PMID: 21493063.
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42. Othman A. Hamed, Arab El-Qisairi, Hanan Qaseer, Emad M. Hamed, Patrick M. Henry, and Daniel P. Becker, Asymmetric  $\alpha$ -Hydroxy Ketone Synthesis by Direct Ketone Oxidation Using a Bimetallic Palladium(II) Complex”, *Tetrahedron Lett.*, **2012**, 53, 2699-2701, 10.1016/j.tetlet.2012.03.066.
43. Marlon R. Lutz Jr., Matthias Zeller, Samuel Sarsah, Artur Filipowicz, Hailey Wouters, and Daniel P. Becker, “Synthesis, Crystal Structure, and Rearrangements of *ortho*-Cyclophane Cyclotriveratrylene (CTTV) Tetraketone”, *Supramolecular Chemistry*, **2012**, 24, 803-809. DOI: 10.1080/10610278.2012.719081.  
<http://www.tandfonline.com/doi/full/10.1080/10610278.2012.719081#.UeA7FkHVCzk>
44. Danuta M. Gillner, Daniel P. Becker, and Richard C. Holz, "Lysine Biosynthesis in Bacteria: A Metallodesuccinylase as a Potential Antimicrobial Target", *Journal of Biological Inorganic Chemistry (JBIC)* **2013**, 18(2), 155-163 DOI: 10.1007/s00775-012-0965-1.  
<http://www.ncbi.nlm.nih.gov/pubmed/23223968> PMID: 23223968, PMCID: PMC3862034.
45. Samuel R.S. Sarsah, Marlon R. Lutz Jr., Matthias Zeller, David S. Crumrine, and Daniel P. Becker, “Rearrangement of Cyclotrimeratrylene (CTV) Diketone: 9,10-Diarylanthracenes with OLED Applications” *J. Org. Chem.* **2013**, 78 2051-2058. DOI: 10.1021/jo302139w.  
<http://pubs.acs.org/doi/abs/10.1021/jo302139w> PMID: 23190432
46. Andria M. Panagopoulos, Doug Steinman, Alexandra Goncharenko, Kyle Geary, Carlene Schleisman, Elizabeth Spaargaren, Matthias Zeller, and Daniel P. Becker, “Apparent Alkyl Transfer and Phenazine Formation via an Aryne Intermediate”, *J. Org. Chem.*, **2013**, 78, 3532–3540, *Featured Article*, DOI: 10.1021/jo302795w; selected for highlighting in Thieme’s *SYNFACTS*.  
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47. Ekaterina I. Filippova, Leigh A. Weston, Misty L. Kuhn, Brett Geissler, Alexandra M. Gehrin, Nicola Armoush, Chinessa T. Adkins, George Minasov, Ievgeniia Dubrovska, Ludmilla Shuvalova, James R. Winsor, Luke D. Lavis, Karla J. F. Satchell, Daniel P. Becker, Wayne F. Anderson, and R. Jeremy Johnson, “Large-scale structural rearrangement of a serine hydrolase from *Francisella tularensis* facilitates catalysis” *J. Biol. Chem.*, **2013**, 288(15), 10522-10535, doi:10.1074/jbc.M112.446625.  
<http://www.jbc.org/content/288/15/10522> PMID: 23430251
48. Samuel R.S. Sarsah, Marlon R. Lutz, Jr., Kailyn Chichi Liu, Daniel P. Becker, “Metal-Free Tandem Beckmann-Electrophilic Aromatic Substitution Cascade Affording Diaryl Imines, Ketones, Amines and Quinazolines” *Tetrahedron Lett.*, **2015**, 56, 5390–5392. <http://dx.doi.org/10.1016/j.tetlet.2015.07.095>
49. Zachary Osner, Richard Holz, and Daniel P. Becker, “An analytical method for detecting toxic metal cations using cyclotrimeratrylene derivative capped gold nanoparticles” *Tetrahedron Lett.*, **2015**, 56, 5419–5423. <http://dx.doi.org/10.1016/j.tetlet.2015.08.005>
50. Cory Reidl, Karolina A Majorek, Joseph Dang, David Tran, Kristen Jew, Melissa Law, Yasmine Payne, Wladek Minor, Daniel P. Becker, and Misty L. Kuhn, “Generating enzyme and radical-mediated bisubstrates as tools for investigating Gcn5-related N-acetyltransferases”, *FEBS Letters*, **2017**, 591, 2348-2361. <https://www.ncbi.nlm.nih.gov/pubmed/28703494>. PMID:28703494, PMCID: PMC5578807.
51. Boguslaw Nocek, Cory Reidl, Anna Starus, Tahirah Heath, David Bienvenue, Jurek Osipiuk, Robert Jedrzejczak, Andrzej Joachimiak, Daniel P. Becker, and Richard C. Holz, “Structural Evidence for a Major Conformational Change Triggered by Substrate Binding in DapE Enzymes: Impact on the

- Catalytic Mechanism”, *Biochemistry*, **2018**, *57*, 574–584. DOI 10.1021/acs.biochem.7b01151. PMID: 29272107.
52. Tahirah Heath, Marlon Lutz, Cory Reidl, Estefany Guzman, Claire Herbert, Boguslaw Nocek, Richard Holz, Ken Olsen, Miguel Ballicora, Daniel P. Becker, “Practical Spectrophotometric Assay for the dapE-Encoded N-Succinyl-L,L-Diaminopimelic Acid Desuccinylase, a Potential Antibiotic Target” *PLoS One*, **2018**, *13*(4): e0196010; doi: 10.1371/journal.pone.0196010. PMID: 29698518, PMCID: PMC5919655.
  53. Marlon R. Lutz Jr., Elizabeth Ernst, Matthias Zeller, Jacob Dudzinski, Peter Thoresen, and Daniel P. Becker, “Attempted Resolution and Racemization of Beckmann-derived CTV-Lactam and the use of Chirabite-AR to Determine Optical Purity of the Supramolecular Scaffold”, *Eur. J. Org. Chem.* **2018**, 4639–4645, DOI: 10.1002/ejoc.201800788.
  54. Wei-Tsung Lee, Matthias Zeller, David Upp, Yuliya Politanska, Doug Steinman, Talal Al-Assil and Daniel P. Becker, “Iron(II) Complexes of an ortho-Triazacyclophane”, *Acta Crystallographica Section C: Structural Chemistry* **2018**, *C74*, 1641-1649, doi/10.1107/S2053229618015255.
  55. Mateusz P. Czub, Brian Zhang, M. Paul Chiarelli, Karolina A. Majorek, Layton Joe, Przemyslaw J. Porebski, Alina Revilla, Weiming Wu, Daniel P. Becker, Wladek Minor, and Misty L. Kuhn, “A Gcn5-related N-acetyltransferase (GNAT) that selectively acetylates polymyxin B and colistin antibiotics”, *Biochemistry*, **2018**, *57* (51), 7011–7020, DOI: 10.1021/acs.biochem.8b00946.
  56. Thahani S. Habeeb Mohammad, Cory T. Reidl, Matthias Zeller, and Daniel P. Becker, Synthesis of a Protected 2-Aminocyclobutanone as a Modular Transition State Synthone for Medicinal Chemistry, *Tetrahedron Letters*, **2020** *61* 151632, <https://doi.org/10.1016/j.tetlet.2020.151632>.
  57. Daniel S. Catlin<sup>§</sup>, Cory T. Reidl<sup>§</sup>, Thomas R. Trzupke, Richard B. Silverman, Brian Cannon, Daniel P. Becker\*, and Dali Liu\*, (S)-4-Amino-5-phenoxy-pentanoate as a Selective Agonist of the Bacterial Transcription Factor GabR” *Protein Science*, **2020**, <http://dx.doi.org/10.1002/pro.3905>. <sup>§</sup>These authors contributed equally.
  58. Marlon R. Lutz, Jr., Sebastian Flieger, Andre Colorina, John Wozny, Narayan S. Hosmane, and Daniel P. Becker, Carborane-containing Matrix Metalloprotease (MMP) Ligands as Candidates for Boron Neutron Capture Therapy (BNCT), *ChemMedChem* **2020**, *15*, 1897-1908. <http://dx.doi.org/10.1002/cmdc.202000470>. Selected by Editors for issue Cover Art.
  59. Dawid Maciorowski, Samir Z. El Idrissi, Yash Gupta<sup>1</sup>, Brian J. Medernach, Michael B. Burns, Daniel P. Becker, Ravi Durvasula<sup>1</sup>, and Prakasha Kempaiah, "A Review of the Preclinical and Clinical Efficacy of Remdesivir, Hydroxychloroquine, and Lopinavir-Ritonavir Treatments Against COVID-19" *SLAS Discovery (Society for Laboratory Automation and Screening)*, **2020**, *25*(10), 1108–1122. Featured article in Special Issue on Drug Discovery Targeting COVID-19. <https://journals.sagepub.com/doi/pdf/10.1177/2472555220958385>
  60. Cory T. Reidl, Tahirah K. Heath, Iman Darwish, Rachel Torrez, Maxwell Moore, Elliot Gild, Boguslaw Nocek, Anna Starus, Richard C. Holz, Daniel P. Becker, "Indoline-6-sulfonamide Inhibitors of the Bacterial Enzyme DapE", *Antibiotics*, **2020**, Sept. 9(9): 595, doi: 10.3390/antibiotics9090595.
  61. Yash Gupta, Dawid Maciorowski, Samantha E. Zak, Krysten A. Jones, Rahul S. Kathayat, Saara-Anne Azizi, Raman Mathur, Catherine M Pearce, David J. Ilc, Hamza Husein, Andrew S. Herbert, Ajay Bharti, Brijesh Rathi, Ravi Durvasula, Daniel P. Becker, Bryan C. Dickinson, John M. Dye, and



- Prakasha Kempaiah, "Bisindolylmaleimide IX: A novel anti-SARS-CoV2 agent targeting viral main protease 3CLpro demonstrated by virtual screening pipeline and in-vitro validation assays". *Elsevier Methods*, **2021**, <https://doi.org/10.1016/j.ymeth.2021.01.003>.
62. Matthew Kochert, Boguslaw P. Nocek, Thahani S. Habeeb Mohammad, Elliot Gild, Kaitlyn Lovato, Tahirah K. Heath, Richard C. Holz, Kenneth W. Olsen, and Daniel P. Becker, "Atomic-Resolution 1.3 Å Crystal Structure, Inhibition by Sulfate, and Molecular Dynamics of the Bacterial Enzyme DapE", *Biochemistry*, **2021**, *60*, 908-917. <https://pubs.acs.org/doi/pdf/10.1021/acs.biochem.0c00926>.
  63. Jackson T Baumgartner, Thahani S Habeeb Mohammad, Mateusz P Czub, Karolina Majorek, Xhulio Arolli, Cillian Variot, Madison Anonick, Wladek Minor, Miguel Angel Ballicora, Daniel P Becker, and Misty L Kuhn, "Gcn5-related N-acetyltransferases (GNATs) with a catalytic serine residue can play ping-pong too", *Frontiers in Molecular Biosciences*, **2021**, Vol 8, 646046, doi: 10.3389/fmolb.2021.646046.
  64. Cory T. Reidl, Romila Mascarenhas, Thahani S. Habeeb Mohammad, Marlon R. Lutz, Jr., Pei W. Thomas, Walter Fast, Dali Liu, and Daniel P. Becker, "A Cyclobutanone Inhibitor of Cobalt-Functionalized Metallo- $\gamma$ -Lactonase AiiA with Cyclobutanone Ring Opening in the Active Site", *ACS Omega*, **2021**, *6*(21), 13567–13578. <http://doi.org/10.1021/acsomega.0c06348>. PMID# PMC8173579.
  65. Yash Gupta, Dawid Maciorowski, Brian Medernach, Daniel P. Becker, Ravi Durvasula, Claudia R. Libertin, Prakasha Kempaiah, "Iron Dysregulation in COVID-19 and Reciprocal Evolution of SARS-CoV-2: *natura nihil frustra facit*", *Journal of Cellular Biochemistry*, **2022**, <http://doi.org/10.1002/jcb.30207>.
  66. Yash Gupta, Steven Goicoechea, Jesus G. Romero, Raman Mathur, Thomas R. Caulfield, Daniel P. Becker, Ravi Durvasula, and Prakasha Kempaiah, "Repurposing Lansoprazole and Posaconazole to treat Leishmaniasis: integration of in vitro testing, pharmacological corroboration, and mechanism of action analysis", *Journal of Food and Drug Analysis*, **2022**, *30*(1), article 11, <https://doi.org/10.38212/2224-6614.3394>
  67. Annette G. Beck-Sickinger, Daniel P. Becker, Oksana Chepurna, Sebastian Flieger, Evamarie Hey-Hawkins, Narayan Hosmane, Satish S. Jalisatgi, Hiroyuki Nakamura, Rameshwar Patil, Maria da Graça H. Vicente, and Clara Viñas, "New Boron Delivery Agents" *Cancer Biotherapy and Radiopharmaceuticals*, **2022**, <https://www.liebertpub.com/doi/10.1089/cbr.2022.0060>.
  68. Thomas DiPuma, Teerana Thabthimthong, Emma H. Kelley, Katherine Konczak, Megan Beulke, Claire Herbert, Thahani Sifna, Anna Starus, Boguslaw Nocek, Kenneth W. Olsen, Richard Holz, and Daniel P. Becker, "Tetrazole-based Inhibitors of the Bacterial Enzyme N-Succinyl-L,L-2,6-Diaminopimelic Acid Desuccinylase as Potential Antibiotics", *Bioorganic & Medicinal Chemistry Letters*, **2023**, <https://doi.org/10.1016/j.bmcl.2023.129177>.
  69. Sebastian Flieger, Mao Takagaki, Natsuko Kondo, Marlon R. Lutz, Jr., Yash Gupta, Graham Moran, Prakasha Kempaiah, Narayan Hosmane, and Daniel P. Becker, "Carborane-Containing Hydroxamate MMP Ligands for the Treatment of Cancers using Boron Neutron Capture Therapy (BNCT)", *International Journal of Molecular Sciences*, **2022**, accepted pending revision.
  70. Thahani Sifna Habeeb Mohammad, Yash Gupta, Cory T. Reidl, Vlad Nicolaescu, Haley Gula, Ravi Durvasula, Prakasha Kempaiah, Daniel P. Becker, "Antiviral Activity of 2-Aminocyclobutanones Targeting SARS-CoV-2 Helicase", **2023**, accepted pending revision.

## SESSIONS CHAIRED

1. American Chemical Society (ACS) Great Lakes Regional Meeting (GLRM), full-day session entitled “Frontiers in Medicinal Chemistry”, May 14, 2009.

## INVITED LECTURES (2011 to present)

1. “Molecular Intimacy: Host-Guest Relationships of Drugs and Synthetic Receptors” April 7, 2011, University of Illinois at Chicago (UIC), Chicago, IL.
2. “Molecular Intimacy: Host-Guest Relationships of Drugs and Synthetic Receptors” April 24, 2011, Manchester College, North Manchester, IN.
3. “Drug Discovery – Serendipity and Design”, ACS-Sponsored Symposium entitled “Chemistry—Our Health, Our Future”, October 22, 2011, Columbia College, Chicago, IL.
4. “Medicinal Chemistry in the Design and Synthesis of New Antibiotics Targeting Bacterial Enzymes”, February 26, 2015, Illinois Institute of Technology (IIT), Department of Chemistry, Chicago, IL.
5. “Molecular Intimacy: Design and Synthesis of Inhibitors of Bacterial Metalloenzymes and Supramolecular Scaffolds”, Mar. 23, 2015, Northern Illinois Univ., Dept. of Chemistry, DeKalb, IL.
6. “Medicinal Chemistry in the Design and Synthesis of New Antibiotics Targeting Bacterial Enzymes”, October 1, 2016, plenary lecture, Chicago Organic Symposium, Chicago, IL.
7. “Facing the Challenge of Antibiotic Resistance”, March 30, 2018, Department of Medicinal Chemistry and Pharmacognosy, University of Illinois at Chicago (UIC), Chicago, IL.
8. “Employing Medicinal Chemistry to Face the Challenge of Antibiotic Resistance” November 2, 2018, Smith Lecture Series in the Natural and Mathematical Sciences, Huntington University, Indiana.
9. “Facing the Challenge of Antibiotic Resistance”, November 9, 2018, Department of Chemistry, Marquette University, Milwaukee, WI.
10. “Drug Discovery: New Therapies via Medicinal Chemistry for Bacterial Infections and Cancer”. November 30, 2018, Department of Chemistry, St. Mary’s College, Notre Dame, Indiana.
11. “Employing Medicinal Chemistry to Face the Challenge of Antibiotic Resistance” February 11, 2019, Department of Biological Sciences, Illinois Institute of Technology (IIT).
12. “Design and Synthesis of DapE Inhibitors as Potential Antibiotics with a New Mechanism of Action”, Keynote lecture at the 14<sup>th</sup> Medicinal Chemistry & Drug Design Conference, Edinburgh, U.K., June 10-11 2019.
13. “Carborane-containing Matrix Metalloproteinase (MMP) Enzyme Inhibitors as Tumor-Targeting Ligands for Boron Neutron Capture Therapy (BNCT)”, Keynote lecture at the 9th European Chemistry Congress, Berlin, Germany, June 17-18, 2019.
14. "Small Molecule Drug Discovery Toward the Treatment of COVID-19", Keynote presentation and panelist in the "COVID-19 Small Molecule Drug Discovery" Mayo Clinic School of Continuous Professional Development for the Mayo global community, online webinar, February 22, 2022.

15. Drug Discovery of New Antibiotics Targeting the Bacterial Enzyme DapE, Keynote speaker at the ACS Joliet Section Meeting, Olivet Nazarene University, March 15, 2022.
16. “Design and Synthesis of Carborane-containing Matrix Metalloproteinase Ligands as Candidates for BNCT”, oral presentation and section panelist, National Institutes of Health (NIH) National Cancer Institute (NCI) Workshop on Neutron Capture Therapy (NCT), online workshop, April 20-22, 2022.

#### RECENT PRESENTATIONS AT SCIENTIFIC MEETINGS (2014 to present)

1. Beattie, R. J.; Upp, D.; Tucker, T.; Steinman, D.; Panagopoulos, A.; Nutile, N.; Fanwick, P. E.; Zeller, M.; Smith, T. J.; Becker, D. P. In Peripheral functionalization and complexation of an ortho-triazacyclophane, N, N',N''-trimethyltribenzo-1,4,7-triazacyclononatriene, and Cu(II)-induced rearrangement to a stable cation radical”, 248th ACS National Meeting, San Francisco, CA, August 10-14, 2014, MEDI-515.
2. Cybulla, E.; Wu, R.; Reidl, C.; Gawron, D.; Becker, D. P.; Liu, D., “Molecular mechanism and ligand design of a PLP/GABA-dependent bacterial transcription regulator GabR”, 248th ACS National Meeting, San Francisco, CA, August 10-14, 2014, MEDI-410.
3. Reidl, C.; Starus, A.; Heath, T.; Moore, M.; Choudry, M.; Olsen, K.; Ballicora, M.; Gillner, D.; Holz, R.; Becker, D. P., “Design and synthesis of inhibitors of dimetalloprotease DapE as novel antibiotics”, 248th ACS National Meeting, San Francisco, CA, August 10-14, 2014, MEDI-408.
4. Kaitlyn A. Lovato, Tahirah Heath, Cory Reidl, Anna Starus, Mouneeb Choudry, Maxwell Moore, Danuta Gillner, Miguel Ballicora, Ken Olsen, Richard Holz, and Daniel P. Becker, “Creating the next antibiotic: Identifying and synthesizing inhibitors of the bacterial enzyme DapE”, Council for Opportunity in Education’s 33rd Annual Conference, Washington, D.C., September 7-9, 2014.
5. Maxwell Moore, Cory Reidl, Alesha Stewart, Pei W. Thomas, Walter Fast, and Daniel Becker, “Sulfonyl Indoline Inhibitors of NDM-1”, 7<sup>th</sup> Annual Chicago Organic Symposium, July 11, 2015, University of Illinois Chicago, Chicago, IL.
6. Kaitlyn A. Lovato, Tahirah Heath, Cory Reidl, Anna Starus, Mouneeb Choudry, Maxwell Moore, Danuta Gillner, Miguel Ballicora, Ken Olsen, Richard Holz, and Daniel P. Becker, “Creating the next antibiotic: Identifying and synthesizing inhibitors of the bacterial enzyme DapE”, oral presentation at the Undergraduate Research Symposium, Nov. 7, 2014, Argonne National Laboratories, Lemont, IL.
7. Donna Gawron, Cory Reidl, Karolina A. Majorek, Misty Kuhn, Wladek Minor, and Daniel P. Becker, “Functionalized Substrate for Covalent Modification of GNAT PA4794 and Co-substrate CoA”, 7th Annual Chicago Organic Symposium, July 11, 2015, University of Illinois Chicago, Chicago, IL.
8. Kaitlyn A. Lovato, Tahirah Heath, Cory Reidl, Anna Starus, Mouneeb Choudry, Maxwell Moore, Danuta Gillner, Miguel Ballicora, Ken Olsen, Richard Holz, and Daniel P. Becker, “Creating the next antibiotic: Identifying and synthesizing inhibitors of the bacterial enzyme DapE”, oral presentation at the McNair Symposium, July 30 – August 2, 2015, University of California at Berkeley, Berkeley, CA.
9. Kaitlyn A. Lovato, Tahirah Heath, Cory Reidl, Anna Starus, Mouneeb Choudry, Maxwell Moore, Danuta Gillner, Miguel Ballicora, Ken Olsen, Richard Holz, and Daniel P. Becker, “Fighting antibiotic resistance: Identifying and synthesizing inhibitors of the bacterial enzyme DapE”, oral presentation at the Gulf Coast Undergraduate Research Symposium (GCURS), October 17, 2015, Bioscience

Research Collaborative: Rice University, Houston, TX. *Outstanding Presentation Award.*

10. Tahirah Heath, Alesha Stewart, Pei W. Thomas, Walter Fast, and Daniel P. Becker, "Design, synthesis, and NDM-1 inhibitory potency of indoline sulfonamides" MEDI 348, poster presentation at the 251<sup>st</sup> National American Chemical Society (ACS) meeting, San Diego, CA, March 13-17, 2016.
11. Anthony B. Ketner, Ross J. Beattie, Phillip E. Fanwick, Daniel P. Becker, Thomas J. Smith, "A New Type of Nitrogen Cation Radical Generated from Copper(II)-Induced Oxidation of a Nine-Membered Macrocyclic N,N'-Dimethyltribenzo-1,4,7-triazacyclononatriene", poster presentation, 2016 National Conference on Undergraduate Research, University of North Carolina-Asheville, April 7-9, 2016.
12. Rachel Torrez, Tahirah Heath, and Daniel P. Becker, "Synthesis of Indoline-7-Sulfonamide Inhibitors of the Bacterial Enzyme DapE", poster presentation at the 8<sup>th</sup> Yao Yuan Biotech-Pharma Symposium, Chicago, IL April 23, 2016.
13. Cory Reidl, Maxwell Moore, Iman Darwish, Alesha Stewart, Pei W. Thomas, Walter Fast, Daniel P. Becker, "Synthesis and SAR of Indoline Sulfonyl Azide-Derived NDM-1 Inhibitors", poster presentation at the 35<sup>th</sup> National Medicinal Chemistry Symposium, June 26-29, 2016 in Chicago, IL.
14. Iman Darwish, Cory Reidl, Maxwell Moore, Alesha Stewart, Pei W. Thomas, Walter Fast, Daniel P. Becker, "Development of inhibitors of the di-zinc metallo beta-lactamase NDM-1." Poster at the 252<sup>nd</sup> National American Chemical Society (ACS) Meeting, Aug. 21-25, 2016, Philadelphia, PA. MEDI-135.
15. Cory Reidl, Iman Darwish, Maxwell Moore, Alesha Stewart, Pei W. Thomas, Walter Fast, Daniel P. Becker, "Synthesis and SAR of sulfonyl azide-derived NDM-1 inhibitors". Poster presentation at the 252<sup>nd</sup> National ACS Meeting, August 21-25, 2016 in Philadelphia, PA. MEDI-288.
16. Rachel Torrez, Tahirah Heath, Daniel P. Becker, "Identification and Synthesis of Novel Inhibitor for Bacterial Enzyme DapE", poster presentation at the 25<sup>th</sup> Annual National McNair Research Conference, October 29-30, 2016 in Delovan, WI.
17. Cory Reidl, Karolina A Majorek, Joseph Dang, David Tran, Kristen Jew, Melissa Law, Yasmine Payne, Wladek Minor, Daniel P. Becker, and Misty L. Kuhn, "PA4794 Gcn5-related N-acetyltransferase bisubstrate inhibitors and mechanistic insights from co-crystal structures, site-directed mutants, and molecular dynamics" poster at ASBMB, April 22-26, 2017, Chicago, IL.
18. Estefany Guzman, Cory Reidl, Max Moore, Dali Liu, and Daniel P. Becker, "Pyridoxal Tetrazole Analogues: Synthesis and Modeling of Novel Aminotransferase Inhibitors", poster presentation at the 25<sup>th</sup> Annual National Ronald E. McNair Scholars Symposium, July 27-30, 2017, University of California at Berkeley, CA.
19. Madison Anonick, Thahani S. Habeeb Mohammad, Cory Reidl, Xhulio Arolli, Misty Kuhn, Daniel P. Becker, "Synthesis and Acetylation of GNAT PA3944 Substrate Analogs", poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 20, 2018 Northwestern Univ., Evanston, IL.
20. Matthew Kochert, Tahirah Heath, Kaitlyn Lovato, Daniel P. Becker, Boguslaw Nocek, and Kenneth Olsen, "Molecular Dynamics of the Conformational Change of DapE", poster at the Midwest Enzyme Chemistry Conference (MECC), Oct. 20, 2018 at Northwestern University, Evanston, IL.
21. Thahani S. Habeeb Mohammad, Cory Reidl, and Daniel P. Becker, "Synthesis and N-Functionalization of 2-aminocyclobutanones as potential serine protease inhibitors", poster presentation at the Midwest

Enzyme Chemistry Conference (MECC), Oct. 20, 2018 at Northwestern University, Evanston, IL.

22. Cory T. Reidl, Dan Catlyn, Thomas R. Trzuppek, Richard B. Silverman, Dali Liu, and Daniel P. Becker, "GABA-derived ligands as modulators of transcription factor GabR and X-ray crystal structure of a phenoxy-GABA derivative", poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 20, 2018 at Northwestern University, Evanston, IL.
23. Marlon R. Lutz, John Wozny, Narayan Hosmane, and Daniel P. Becker, "Carborane-containing Matrix Metalloproteinase (MMP) Enzyme Inhibitors as Tumor-Targeting Ligands for BNCT" poster at the Chicago Organic Symposium (COS), Oct. 20, 2018, Northwestern University, Evanston, IL.
24. Thahani S. Habeeb Mohammad, Cory Reidl, and Daniel P. Becker, "Synthesis and N-Functionalization of 2-aminocyclobutanones as potential serine protease inhibitors", poster presentation at the National ACS Meeting, April 3, 2019, Orlando, Florida. MEDI-349.
25. Charles Houseman, Cillian Variot, Jackson Baumgartner, Cory Reidl, Daniel P. Becker and Misty L. Kuhn, "Characterizing PA3944 and PA3945 Gcn5-related N-acetyltransferases (GNATs) from *Pseudomonas aeruginosa* in vitro", poster presentation at San Francisco State University, May 3, 2019.
26. T. Habeeb Mohammad, Cory Reidl, Madison Anonick, Xhulio Arolli, Misty L. Kuhn, and Daniel P. Becker, "Synthesis and acetylation of GNAT PA3944 substrate analogs", Poster presentation at the Great Lakes Regional ACS Meeting, May 1-4, 2019, Lisle, IL.
27. Thahani S. H. Mohammad, Cory Reidl, Matthias Zeller, and Daniel P. Becker, "Synthesis of 2-aminocyclobutanones as serine- and metalloprotease inhibitors". Poster presentation at the Chicago Area ACS Meeting, Loyola University Chicago, September 24, 2019.
28. Sebastian Flieger, Marlon R. Lutz, Jr., and Daniel P. Becker, "Carborane-Containing  $\alpha$ -Sulfone Hydroxamate MMP Inhibitors for Boron Neutron Capture Therapy (BNCT) in Cancer Treatment". Poster at the Chicago Area ACS Meeting, Loyola University Chicago, September 24, 2019.
29. Isaac Schwarz, Sebastian Flieger, Marlon Lutz Jr., Daniel P. Becker, "Synthesis of a novel, MMP-inhibitor based boron delivery agent for use in boron neutron capture therapy (BNCT) for cancer treatment". Poster presentation at the Chicago Area ACS Meeting, Loyola University Chicago, September 24, 2019.
30. Isaac Forrest Schwarz, Sebastian Flieger, Marlon R. Lutz Jr., and Daniel P. Becker "Synthesis of a novel, MMP-inhibitor-based boron delivery agent for use in Boron Neutron Capture Therapy (BNCT) for cancer treatment", poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 26, 2019, Illinois Institute of Technology (IIT), Chicago, IL.
31. Oliwia Ozog, Daniel P. Becker, Kenneth W. Olsen, "Synthesis of bis-Sulfonates as DapE Inhibitors for the Creation of Novel Antibiotics", poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 26, 2019, Illinois Institute of Technology (IIT), Chicago, IL.
32. Elliot Ewers Gild, Thahani Habeeb, Tahirah K Heath, Daniel P. Becker, "Spectrophotometric Assay for dapE-Encoded N-Succinyl-L,L-Diaminopimelic Acid Desuccinylase, a Potential Antibiotic Target", poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 26, 2019, Illinois Institute of Technology (IIT), Chicago, IL.

33. Matthew S Kochert, T. K. Heath, K. Lovato, K. W. Olsen, B. P. Nocek, and Daniel P. Becker, "Molecular Dynamics of the Conformational Change of DapE", poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 26, 2019, Illinois Institute of Technology (IIT), Chicago, IL.
34. Sebastian Flieger, Marlon R. Lutz, Jr., and Daniel P. Becker, "Carborane-Containing  $\alpha$ -Sulfone Hydroxamate MMP Inhibitors for Boron Neutron Capture Therapy (BNCT) in Cancer", poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 26, 2019, Illinois Institute of Technology (IIT), Chicago, IL.
35. Thahani S. Habeeb Mohammad, Cory T. Reidl, Madison V. Anonick, Xhulio Arolli, Misty Kuhn, and Daniel P. Becker, "Synthesis and Acetylation of GNAT PA3944 Substrate Analogs", poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 26, 2019, Illinois Institute of Technology (IIT), Chicago, IL.
36. Xhulio Arolli, Madison Anonick, Thahani S. Habeeb Mohammad, Cory Reidl, Jackson T. Baumgartner, Misty Kuhn, and Daniel P. Becker, "Molecular Docking and Synthesis of GNAT PA3944 Substrates and Inhibitors", poster presentation at the 40th Midwest Enzyme Chemistry Conference (MECC), October 24, 2020, virtual from University of Texas at Arlington.
37. Thahani S. Habeeb Mohammad, Tahirah K. Heath, Elliot Gild, Rachel M. Torrez, Anna Starus, Rick C. Holz, and Daniel P. Becker, "Design and synthesis of DapE inhibitors as potential antibiotics", poster presentation at the 40th Midwest Enzyme Chemistry Conference (MECC), October 24, 2020, virtual from University of Texas at Arlington.
38. Oliwia Ozog, Elliot Gild, Ken W. Olsen, and Daniel P. Becker, "Synthesis of Bis-sulfonates as DapE Inhibitors to Study Enzyme Conformational Dynamics and Catalysis", poster presentation at the 40th Midwest Enzyme Chemistry Conference (MECC), October 24, 2020, virtual from University of Texas at Arlington.
39. Kristeen Bebla, Daniel P. Becker and Kenneth W. Olsen, "Design of New Inhibitors of the Bacterial Enzyme DapE Using Molecular Modeling", poster presentation at the 40th Midwest Enzyme Chemistry Conference (MECC), October 24, 2020, virtual from University of Texas at Arlington.
40. Matt Kochert, Tahirah K. Heath, Elliot Gild, Kaitlin Lovato, Boguslaw P. Nocek Daniel P. Becker, "Molecular Dynamics of the Conformational Change of DapE", poster presentation at the 40th Midwest Enzyme Chemistry Conference (MECC), October 24, 2020, virtual from University of Texas at Arlington.
41. Katie Jane Torma, Thahani S. Habeeb Mohammad, Thomas J. DiPuma, Elliot Gild, Anna Starus, Rick C. Holz, and Daniel P. Becker, "Synthesis of Tetrazole-Based DapE Inhibitors as Potential Antibiotics", poster presentation at the 40th Midwest Enzyme Chemistry Conference (MECC), October 24, 2020, virtual from University of Texas at Arlington.
42. Sebastian Flieger and Daniel P. Becker, "Carborane-Containing Matrix Metalloproteinase (MMP) Ligands as Candidates for Boron Neutron Capture Therapy (BNCT)", oral presentation at the 40th Midwest Enzyme Chemistry Conference (MECC), October 24, 2020, virtual from University of Texas at Arlington.
43. Yash Gupta, Dawid Maciorowski, Raman Mathur, Ajay Bharti, Daniel P. Becker, Brijesh Rathi, Ravi Durvasula, Steven Bradfute, and Prakasha Kempaiah, "Beyond Hydroxychloroquine: Dissecting

SARS-CoV-2 Functional Druggability Through Multi-target CADD Screening of Repurposable Drugs”, poster presentation at the American Society of Tropical Medicine and Hygiene (ASTMH) annual meeting, online, Nov 15-19, 2020.

44. Teerana Thabthimthong, Thomas B. DiPuma, Emma Kelley, and Daniel P. Becker, “Tetrazole Thioether Derivatives as Potential Novel Antibiotics”, poster presentation at the 41st Midwest Enzyme Chemistry Conference, Oct. 23, 2021, Grand Valley State University, Allendale, MI. *Award for the Top Undergraduate Research Poster Presentation.*
45. Thahani S. H. Mohammad, Yash Gupta, Ravi Durvasula, Prakasha Kempaiah, and Daniel P. Becker, “Design and Synthesis of Inhibitors Targeting SARS-CoV-2 Helicase and Main protease through Computer-Aided Drug Design, poster presentation at the National ACS Meeting, August 21, 2022, Chicago, Illinois.
46. Oliwia Ozog, Presenter; Madison Smith; Xhulio Arolli; Pengfei Li; Ken Olsen; Daniel Becker, “Identifying the zinc-bridging oxygen in the active site of DAPe using computational chemistry”, poster presentation at the National ACS Meeting, August 21, 2022, Chicago, Illinois.
47. Katherine Konczak, Presenter; Oliwia Ozog; Emma Kelley; Megan Beulke; Ken Olsen; Daniel Becker, “Molecular dynamics and synthesis of DapE bacterial enzyme inhibitors as potential novel antibiotics”, poster presentation at the National ACS Meeting, August 21, 2022, Chicago, Illinois.
48. Megan Beulke, Presenter; Emma Kelley; Katherine Konczak; Thahani Shifna Habeeb Mohammad; Thomas DiPuma; Teerana Thabthimthom; Sebastian Flieger; Sebastian Flieger; Cory Reidl; Ken Olsen; Daniel Becker, “Evaluation of DapE inhibitors utilizing the DapE ninhydrin and thermal shift assays toward the discovery of novel antibiotics, poster presentation at the National ACS Meeting, August 21, 2022, Chicago, Illinois.
49. Emma Kelley, Presenter; Thahani Habeeb Mohammed; Megan Beulke; Katherine Konczak; Sergii Pshenychnyi; Karla Satchell; Ken Olsen; Daniel Becker, “Cyclobutanone inhibitors of the bacterial enzyme DapE as potential antibiotics with a new mechanism of action”, poster presentation at the National ACS Meeting, August 21, 2022, Chicago, Illinois.
50. Zach Liveris, Presenter; Marlon Lutz; Emma Simmons; Emma Kelley; Megan Beulke; Katherine Konczak; Daniel Becker, “Synthesis of the N-succinyl-L,L-diaminopimelic acid desuccinylase (DapE) substrate analog N,N-dimethyl-SDAP and its binding to DapE”, poster presentation at the National ACS Meeting, August 23, 2022, Chicago, Illinois.
51. Sebastian Flieger, Presenter; Sebastian Flieger, Presenter; Emma Kelley; Channing Baker; Thahani Shifna Habeeb Mohammad; Oliwia Ozog; Rachel Torrez; Hannah Greenhill; Amber Brown; Ashleigh Lucas; Anna Starus; Richard Holz; Innocent Demshemino; Daniel Becker, “Design and synthesis of N-Aryl sulfonamides inhibitors of N-succinyl-L,L-diaminopimelic acid (DapE) as potential antibiotics with a new mechanism of action”, oral presentation at the National ACS Meeting, August 24, 2022, Chicago, Illinois.
52. Sebastian Flieger, Presenter; Sebastian Flieger, Presenter; Marlon Lutz; Isaac Schwarz; Narayan Hosmane; Daniel Becker, “Synthesis of carborane-containing Matrix metalloproteinase (MMP) ligands as candidates for boron neutron capture therapy, poster presentation at the National ACS Meeting, August 24, 2022, Chicago, Illinois.

53. Thomas J DiPuma, Teerana Thabthimthong; Emma Kelley; Megan Beulke; Katherine Konczak; Anna Starus; Richard Holz; Ken Olsen; Daniel Becker, "Design and synthesis of tetrazole and pyrazole derivatives as inhibitors of the bacterial enzyme N-succinyl-L,L,-2,6-diaminopimelic acid desuccinylase (DapE)", 3750715-MEDI, poster presentation at the National ACS Meeting, August 24, 2022, Chicago, Illinois.
54. Zach Liveris, Presenter; Sebastian Flieger; Sebastian Flieger; Emma Simmons; Ming Yuan; Karina Tuz; Oscar Juarez; Daniel Becker, "Inhibition of the sodium-dependent NADH:Ubiquinone oxidoreductase (NQR) in pathogenic bacteria, poster presentation at the National ACS Meeting, August 24, 2022, Chicago, Illinois.
55. Megan G. Beulke, Emma Kelley, Katherine Konczak, Thahani S. Habeeb Mohammad, Thomas DiPuma, Teerana Thabthimthong, Sebastian Flieger, Corey Reidl, Sergii Pshenychnyi, Karla J. F. Satchell, Kenneth W. Olsen and Daniel P. Becker, "Discovering Novel Antibiotics by Evaluating DapE Inhibitors Utilizing the DapE Ninhydrin-based Assay, Poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 15, 2022.
56. Thomas DiPuma, Teerana Thabthimthong, Emma Kelley, Megan Beulke, Katherine Konczak, Anna Starus, Richard Holz, and Daniel P. Becker "Design And Synthesis of Tetrazole & Pyrazole-based Bioisosteres as novel antibiotics towards the bacterial enzyme N-Succinyl-L,L,-2,6-Diaminopimelic Acid Desuccinylase", Poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 15, 2022.
57. Emma Kelley, Thahani S. Habeeb Mohammed, Allison Sullivan, Sergii Pshenychnyi, Karla J.F. Satchell, Gayatri Vedantam, Ken Olsen, and Daniel P. Becker, "Cyclobutanone Derivatives as new Inhibitors for the Bacterial Enzyme DapE", Poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 15, 2022.
58. Katherine E. Konczak, Emma H. Kelley, Boguslaw Nocek, Sergii Pshenychnyi, Andrzej Joachimiak, Karla J.F. Satchell, Kenneth W. Olsen, and Daniel P. Becker, "Thermal Shift Analysis of DapE Bacterial Enzyme Inhibitors as Potential Novel Antibiotics", Poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 15, 2022.
59. Zachary Liveris, Sebastian Flieger, Emma Simmons, Ming Yuan, Karina Tuz, Oscar Juarez, and Daniel P. Becker, "Inhibition of the Sodium-Dependent NADH:Ubiquinone Oxidoreductase (NQR) in Pathogenic Bacteria by Naphthoquinone Derivatives", Poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 15, 2022.
60. Evan P. Scruggs, Sebastian Flieger, Ming Yuan, Yuyao Hu, Oscar Juarez, and Daniel P. Becker, "Design and synthesis of inhibitors of sodium-dependent NADH:Ubiquinone oxidoreductase (Na<sup>+</sup>-NQR) as new antibiotics agents", Poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 15, 2022.
61. Jennifer Sorescu, Tien Do, Sebastian Flieger, Zachary Liveris, Karina Tuz, David Minh, Daniel P. Becker, and Oscar Juarez, "Development of novel antibiotics against Pseudomonas aeruginosa SDH", Poster presentation at the Midwest Enzyme Chemistry Conference (MECC), Oct. 15, 2022.

#### ***SPECIAL TOPICS INVITED LECTURES***

1. "A Retrospective on Sustainable Development and a Glance at the Future" May 17, 2005, Illinois Institute of Technology, Chicago, Illinois.



2. "An Analysis of Genetically Modified Crops as a Potential Sustainable Development Strategy" October 25, 2006, invited topic for business graduate course in Environmental Business Management, Stuart School of Business, Illinois Institute of Technology, Chicago, Illinois.
3. "Sustainable Development in Industry" October 29, 2007, invited topic for business graduate course in Environmental Business Management, Stuart School of Business, IIT, Chicago.
4. "Biotechnology and Genetically-Modified Organisms—A Strategy for Sustainable Business Development?" November 11, 2010, Stuart School of Business, IIT, Chicago.
5. "Bizarre and Beautiful Bats", March 14, 2011 in a survey course sponsored by the Center for Urban and Environmental Research and Policy (CUERP), Loyola University Chicago.
6. "The Global Ecological and Economic Importance of Chiroptera With Striking Morphological Diversity" January 31, 2012 at the Patty Turner Center, Deerfield, IL.

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1. Daniel P. Becker, Paul W. Collins, Daniel L. Flynn, "N6-Substituted Adenosine Compounds". **US 5,055,569**, issued 10/8/91.
2. Daniel L. Flynn, Daniel P. Becker, Alan E. Moormann, Roger Nosal, and Clara I. Villamil. "Pharmaceutically Useful Meso-Azacyclic Amides of Imidazopyridine Carboxylic Acids and Analogs Thereof". **US 5,137,893**, issued 8/11/92
3. Daniel L. Flynn, Daniel P. Becker, Roger Nosal, Dale Spangler, and Daniel L. Zabrowski. "Azatetracycle Compounds". **US 5,140,023**, issued 8/18/92; **USRE35218**, issued 4/23/96.
4. Daniel L. Flynn, Daniel P. Becker, Alan E. Moormann, Roger Nosal, and Clara I. Villamil. "New Imidazopyridines as Serotonergic 5-HT<sub>3</sub> Antagonists". **US 5,196,547**, issued 3/23/93.
5. Daniel L. Flynn, Daniel P. Becker, and Clara I. Villamil. "N-Substituted Lactams Useful As Cholecystokinin Antagonists", **US 5,202,344**, issued 4/13/93.
6. Daniel L. Flynn, Daniel P. Becker, Alan E. Moormann, Roger Nosal, and Clara I. Villamil. "Pharmaceutically Useful Meso-Azacyclic Amides of Imidazopyridine Carboxylic Acids and Analogs Thereof". **US 5,219,850**, issued 6/15/93.
7. Daniel P. Becker, Daniel L. Flynn, Roger Nosal, Dale P. Spangler, and Daniel L. Zabrowski. "Azatetracycle Compounds and Process of Preparing Same" **US 5,223,613**, issued 6/29/93.
8. Daniel L. Flynn, Alan E. Moormann, Daniel P. Becker, Roger Nosal, Clara I. Villamil, "Imidazopyridines as Serotonergic 5-HT<sub>3</sub> Antagonists" **US 5,260,303**, issued 11/9/93.

9. Daniel L. Flynn, Daniel P. Becker, Alan E. Moormann, and Clara I. Villamil. "Meso-Azacyclic Amides of Imidazopyridine Carboxylic Acids and Analogs Thereof". **US 5,280,029**, issued 1/18/94.
10. Daniel L. Flynn, Daniel P. Becker, and Clara I. Villamil. "N-Substituted Lactams Useful As Cholecystokinin Antagonists", **US 5,314,886**, issued 5/24/94.
11. Daniel L. Flynn, Daniel P. Becker, Alan E. Moormann, Roger Nosal, and Clara I. Villamil. "New Meso-Azacyclic Aromatic Acid Amides and Esters as Novel Serotonergic Agents". **US 5,318,977**, issued 6/7/94.
12. Daniel P. Becker, Daniel L. Flynn, Clara I. Villamil, "Indolones Useful as Serotonergic Agents". **US 5,399,562**, issued 3/21/95.
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14. Daniel L. Flynn, Daniel P. Becker, Alan E. Moormann, Roger Nosal, and Clara I. Villamil. "Imidazopyridines as Serotonergic 5-HT<sub>3</sub> Antagonists". **US 5,434,161**, issued 7/18/95.
15. Daniel L. Flynn, Daniel P. Becker, Alan E. Moormann, Roger Nosal, and Clara I. Villamil. "New Meso-Azacyclic Aromatic Acid Amides and Esters as Novel Serotonergic Agents". **US 5,516,782**, issued 5/14/96.
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17. Daniel P. Becker, Daniel L. Flynn, Clara I. Villamil, "Meso-azanoradamantanes". **US 5,530,018**, issued 6/25/96.
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28. Norman Abood, Daniel Flynn, Daniel Becker, Brian Bax, Hui Li, Roger Nosal, Lori Schretzman, Clara Villamil, "2-Amino benzoxazinones for the treatment of viral infections" **US 6,380,189**, iss. 4/30/02.
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30. Villamil, Clara, John N. Freskos, Brent V. Mischke, Patrick B. Mullins, Robert M. Heintz, Daniel P. Getman, Joseph J. McDonald; DeCrescenzo, Gary A., Thomas E. Barta; Daniel P. Becker "N-Hydroxy 4-Sulfonyl Butanamide Compounds" **US 6,476,027**, issued 11/5/02.
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39. Barta, Thomas; Becker, Daniel; Bedell, Louis; DeCrescenzo, Gary; Freskos, John; Getman, Daniel; McDonald, Joseph; Mischke, Brent; Rao, Shashidhar; Villamil, Clara I., "Sulfonyl Aryl Hydroxamates and Their Use as Matrix Metalloprotease Inhibitors" **US 6,696,449**, issued Feb. 24, 2004.
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43. Becker; Daniel P.; DeCrescenzo; Gary A.; Malecha; James W.; Miyashiro; Julie M.; Van Camp; Jennifer Ann; Collins; Joe T.; "Sulfone liver X-receptor modulators", **US 6,822,120**, issued 11/23/04.
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#### **PENDING U.S. PATENT APPLICATIONS**

1. “Heterocyclic Inhibitors of Histamine Receptors for the Treatment of Disease” **PCT 13/044,906**, US20110257137 A1, WO2011112731A2, WO2011112731A3, filed 3/10/11, published 10/20/11.
2. Daniel P. Becker and Marlon Lutz, “Carborane Hydroxamic Acid Matrix Metalloproteinase Inhibitors for Boron Neutron Capture Therapy” New Provisional Application - (**27013/50760 US**), 2018 Provisional filed 6-29-18 with the U.S. Patent Office, PCT/US19/39771.
3. Daniel P. Becker and Sebastian Flieger, “Carborane Hydroxamic Acid Matrix Metalloproteinase Agents for Boron Neutron Capture Therapy”, New Provisional Application, U.S. Patent Application No. 62/861,666 filed 6-14-19, WO2020252439-PAMPH-20201217-4012.

2-12-23