

6/19/19

Mark J. Snider
Robert E. Wilson Professor of Chemistry

Department of Chemistry
The College of Wooster
931 College Mall
Wooster, OH 44691

(330) 263-2391
FAX (330) 263-2386
msnider@wooster.edu

<https://www.wooster.edu/bios/msnider/>
Scopus Author ID: 7007076689

EDUCATION	Ph.D. 2001	Biochemistry with emphasis in Biophysics University of North Carolina – Chapel Hill Department of Biochemistry & Biophysics Advisor: Professor Richard Wolfenden Dissertation title: <i>Thermodynamic Analysis of the Mechanism of Escherichia coli Cytidine Deaminase</i> © 2001
	B.A. 1997	Chemistry, <i>summa cum laude</i> Capital University, Columbus Ohio
EMPLOYMENT	2015 –	Professor of Chemistry, The College of Wooster
	2013 – 2016	Chairperson, Department of Chemistry, The College of Wooster
	2013 –	Robert E. Wilson Endowed Professorship in Chemistry
	2012	Honorary Fellow, Department of Biochemistry, University of Wisconsin-Madison (sabbatical)
	2008 – 2011	Chairperson, Biochemistry & Molecular Biology Program, Wooster
	2007 – 2008	Visiting Scientist, Department of Chemistry & Chemical Biology, Cornell University (sabbatical)
	2007 – 2015	Associate Professor of Chemistry, The College of Wooster
	2002 – 2007	Assistant Professor of Chemistry, The College of Wooster
	2001 – 2002	Postdoctoral Teaching/Research Fellow, Department of Chemistry, The College of Wooster (Mentor: Prof. Charles L. Borders, Jr.)
SABATICAL/ RESEARCH LEAVES	2018 – 2019	at The College of Wooster; Transient state kinetic analysis of the mechanism of 6-hydroxynicotinate-3-monooxygenase, and the genes of nicotinate degradation in <i>Bacillus niacini</i> .
	2012 – 2013	with Professor W. W. Cleland, Department of Biochemistry, University of Wisconsin, Madison, WI and with Professor David Ballou, Department of Biological Chemistry, University of Michigan, Ann Arbor, MI
	2007 – 2008	with Professor Tadhg P. Begley, Department of Chemistry & Chemical Biology, Cornell University, Ithaca, NY
CURRENT RESEARCH INTERESTS		Mechanistic and structural enzymology of aerobic nicotinic acid (vitamin B ₃) catabolism; mechanistic studies of microbial degradation of antidepressants; characterizing proteins of unknown function through chemical identification of the protein-bound ligands; functional characterization of phosphagen kinases to understand molecular evolution.

EXTERNALLY-FUNDED RESEARCH GRANTS

- 2018- National Science Foundation: Molecular Biophysics Program
RUI: Collaborative Research: Enzymology of Bacterial Nicotinic Acid Catabolism
by Mark Snider (PI), Katherine Hicks (PI, SUNY Cortland) \$ 551,536.
- 2016-2019: National Science Foundation: Major Research Instrumentation Program
Acquisition of an NMR Spectrometer to Sustain Excellence in Undergraduate Research
by Paul Bonvallet (PI), Judith Amburgey-Peters (Co-PI), Spring Knapp (Co-PI), Mark Snider (Co-PI) and Sarah Sobeck (Co-PI); \$343,697
- 2012-2014: Research Corporation for Science Advancement: Multi-Investigator Cottrell College Science Award Program: *Bacterial Degradation of Pharmaceuticals and Personal Care Products During Waste Water Treatment*; by Stephanie Strand (Microbiologist) and Melissa Schultz (Analytical Chemist) and Mark Snider (Biochemist); \$100,000
- 2008-2011: National Science Foundation: Major Research Instrumentation Program
Acquisition of an LC/MS/MS to Enhance Undergraduate Research and Teaching
by Melissa Schultz (PI), Paul Edmiston (Co-PI) and Mark Snider (Co-PI); \$ 226,115
- 2006-2009: National Science Foundation: Major Research Instrumentation Program
Acquisition of an Isothermal Titration Calorimeter
by Paul Bonvallet (PI), Don Jacobs (Co-PI) and Mark Snider (Co-PI); \$ 91,090
- 2004-2007: National Science Foundation: Metabolic Biochemistry Program
RUI: Comparative Structure – Function Analysis of Phosphagen Kinases
by Mark Snider (PI), Paul Edmiston (Co-PI) and Dean Fraga (Co-PI); \$ 320,307

INTERNALLY-FUNDED COMPETITIVE RESEARCH GRANTS

- 2018: Hamburger Endowment for Collaborative Projects and Program Development Award; Biophysical Characterization of Multi-Subunit Enzymes by Susan Lehman (Physics) and Mark Snider (Chemistry); \$7,050
- 2018: William H. Wilson Award; Acquisition of a Schlenk-line set-up for anaerobic research on nicotinate degradation enzymes; \$2,043
- 2017: Henry Luce III Award for Distinguished Scholarship to support mechanistic studies of the enzymes involved in bacterial nicotinate catabolism; \$6,645.
- 2017: Hamburger Endowment for Collaborative Projects and Program Development Award; Evolution of Inter-subunit Cooperativity in Protein Dimers by Dean Fraga (Biology) and Mark Snider (Chemistry) \$10,694
- 2017: William H. Wilson Award; Cloning and characterization of novel genes in *Bacillus niacini* involved in nicotinate degradation; \$1,500
- 2015: William H. Wilson Award; Cloning and characterization of novel *Bacillus niacini* nicAB genes; \$1,550.
- 2014-17: Clare Boothe Luce Mentor (Laura Sherer, BCMB '17) for the cloning and characterization of *Bacillus niacini* genes putatively involved in nicotinate degradation.
- 2013-15: Henry Luce III Award for Distinguished Scholarship to employ 2nd generation sequencing techniques to establish the nicotinate degradation gene cluster in *Bacillus* species; \$2,900.
- 2013-15: Clare Boothe Luce Mentor (Abigail Daniel, BCMB '15) for genetic and biochemical analysis of 6-hydroxyniconinate monooxygenase in *Bordetella pertussis*.
- 2013: Howard Hughes Medical Institute Undergraduate Science Education Program Award for summer research mentoring (1 student) and supplies; \$7,000
- 2013: Howard Hughes Medical Institute Undergraduate Science Education Program Award for analytical scale gel filtration columns and fraction collectors for the determination of oligomeric structures of enzymes in classroom and research projects; \$4,700.
- 2013: William H. Wilson Award; Acquisition of preparative scale high-resolution gel filtration

- column for preparation of the crystallization of enzymes for structural studies by X-ray diffraction; \$2,350.
- 2012: William H. Wilson Award; Acquisition of software for kinetic analysis of enzyme-catalyzed reactions by UV spectroscopy; \$1,200.
- 2012: Howard Hughes Medical Institute Undergraduate Science Education Program Award to investigate structure-function relationships in maleamate amidohydrolase by site-directed mutagenesis; \$2,000.
- 2011-12: Henry Luce III Award for Distinguished Scholarship to work with Professor W. W. Cleland at the University of Wisconsin-Madison for development of natural abundance kinetic isotope effects by isotope ratio mass spectrometry to determine the structure of the transition state for reactions catalyzed by maleamate amidohydrolase and 6-hydroxynicotinate monooxygenase; \$4,000
- 2011: Howard Hughes Medical Institute Undergraduate Science Education Program Award for summer research mentoring (5 students) and supplies; ~\$30,000
- 2010-11: Howard Hughes Medical Institute Undergraduate Science Education Program Award to employ modern DNA sequencing techniques to identify the genes expressed in *Pseudomonas* for degradation of Zoloft™ (sertraline); \$5,000
- 2010-11: Henry Luce III Award for Distinguished Scholarship to employ modern DNA sequencing techniques to identify the genes expressed in *Pseudomonas* for degradation of Zoloft™ (sertraline); \$5,000
- 2010-11: Howard Hughes Medical Institute Undergraduate Science Education Program Award for laboratory equipment to cryoprotect and transport protein crystals for x-ray structural studies of enzymes involved in nicotinic acid degradation; \$4,287
- 2010: Howard Hughes Medical Institute Undergraduate Science Education Program Award for summer research mentoring (7 students) and supplies; ~\$40,000
- 2010: William H. Wilson Award; Acquisition of reverse-phase HPLC columns for mechanistic studies of enzyme mechanisms by LC-mass spectrometry; \$1,000
- 2009: William H. Wilson Award; Acquisition of a table-top centrifuge for studies of microbial degradation of Zoloft™; \$1,800
- 2009: Howard Hughes Medical Institute Undergraduate Science Education Program Award for summer research mentoring & curriculum development; ~\$60,000
- 2008: William H. Wilson Award; Acquisition of affinity columns for purifying proteins of unknown function; \$ 677
- 2006: William H. Wilson Award; Acquisition of a muffle furnace for uncatalyzed biological reactions at high temperature; \$1,200
- 2003: William H. Wilson Award; Acquisition of reverse-phase HPLC columns for analysis of ¹⁸O-kinetic isotope effects in the reaction catalyzed by creatine kinase; \$1,400
- 2003: Elizabeth Ralston Presidential Endowment for Faculty Development Award; \$2,500

PEER-REVIEWED PUBLICATIONS (*College of Wooster undergraduate)

Manuscripts in progress:

S. W. Perkins*, L. Rajakovich, and M. J. Snider; Transient state kinetic analysis of the mechanism of 6-hydroxynicotinate 3-monooxygenase; *manuscript in progress.*

M. J. Snider, I. Lee, M. Aryal*, I. Eccles-James*, J. Anquandah*, J. Fishovitz, J. Graham*, R. Klein*, L. Marcze*, L. Stetzik*, G. Kerwood and D. Fraga; Evolution of inter-subunit communication in the phosphagen kinases: an alternating sites reactivity mechanism for catalysis; *manuscript in progress– to be submitted to Biochemistry.*

P. Chiaranunt*, E. D. Sullivan*, N. Spittle*, M. Anderson, K. Morrison, D. Hilmey, R. S. Rowlett, and M. J. Snider; A structural and functional investigation of the catalytic role of Cys150-Asp29-Lys117 in maleamate amidohydrolase – *manuscript in progress, to be submitted to Biochemistry.*

Manuscripts published:

27. D. Fraga., K. Stock*, M. Aryal*, C. Demoll*, L. Fannin*, and M. J. Snider (2019) Bacterial arginine kinases have a highly skewed distribution within the Proteobacteria. *Comparative Biochemistry and Physiology - Part B* 233, 60-71.
26. K. D. Nakamoto*, S. W. Perkins*, R. G. Campbell*, M. R. Bauerle*, T. G. Gerwig*, S. Gerislioglu, C. Wesdemiotis, M. A. Anderson, K. A. Hicks and M. J. Snider (2019) Mechanism of 6-hydroxynicotinate 3-monoxygenase, a flavin-dependent decarboxylative hydroxylase involved in aerobic nicotinic acid degradation. *Biochemistry* 58; 1751-1763.
25. K. A. Hicks, M. E. Yuen, W.- F. Zhen, T. J. Gerwig*, R. W. Story*, M. Kopp, and M. J. Snider (2016) Structural and biochemical characterization of 6-hydroxynicotinic acid 3-monoxygenase, a novel decarboxylative hydroxylase involved in aerobic nicotinate degradation. *Biochemistry* 55, 3432–3446.
24. D. Fraga, M. Aryal*, J. E. Hall*, E. Rae*, and M. Snider (2015) Characterization of the arginine kinase isoforms in *Caenorhabditis elegans*. *Comparative Physiology and Biochemistry; Part B: Biochemistry & Molecular Biology* 187; 85-101.
23. Z. H. Harvey* and M. J. Snider (2014) Draft genome of the nicotinate-metabolizing soil bacterium *Bacillus niacini* (DSM 2923) *Genome Announc.* 2 (6) e01251-14.
22. A. Palmer*, B. Begress*, J. Van Houten*, M. J. Snider, and D. Fraga (2013) Characterization of a putative oomycete taurocyamine kinase: Implications for the evolution of the phosphagen kinase family. *Comparative Physiology and Biochemistry; Part B: Biochemistry & Molecular Biology*, 166; 173-181.
21. G. K. Schroeder, L. Zhou, M. J. Snider, X. Chen, and R. Wolfenden (2012) The flight of a cytidine deaminase complex with an imperfect transition state analogue inhibitor: mass spectrometric evidence for the presence of a trapped water molecule. *Biochemistry* 51, 6476-6486.
20. J. Bragg, A. Rajkovic*, C. Anderson, R. Curtis, J. V.-Houten*, B. Begres*, C. Naples*, M. Snider, D. Fraga and M. Singer (2012) Identification and characterization of an arginine kinase from *Myxococcus xanthus* required for fruiting body formation and cell differentiation; *J. Bacteriology* 194, 2668-2676.
19. V. A. Kincaid*, E. D. Sullivan*, R. D. Klein*, Jeff W. Noel*, R. S. Rowlett, M. J. Snider (2012) Structure and catalytic mechanism of nicotinate (vitamin B₃) degradative enzyme maleamate amidohydrolase from *Bordetella Bronchiseptica* RB50; *Biochemistry* 51, 545-554.
- Review 18. A. Hazra, M. J. Snider, A. Chatterjee, D. Chatterjee, J. W. Hanes, D. G. Hilmey, K. Krishnamoorthy, K. M. McCulloch, S. O’Leary, J. M. Sanders, M. J. Waitner, and T. P. Begley. Coenzyme and prosthetic group biosynthesis; *Encyclopedia of Microbiology*; Moselio Schaechter, Ed. (2009) Vol. 5, 79-88, Oxford: Elsevier.
17. L. D. Andrews*, J. Graham*, M. J. Snider, D. Fraga. (2008) Characterization of a novel bacterial arginine kinase from *Desulfotalea psychrophilia* – *Comparative Physiology and Biochemistry; Part B: Biochemistry & Molecular Biology* 150: 312-319.
16. M. J. Jourden*, C. N. Clarke*, A. K. Palmer*, E. J. Barth, R. C. Prada*, R. N. Hale*, D. Fraga, M. J. Snider, P. L. Edmiston (2007) Changing the substrate specificity of creatine kinase from creatine to glycoyamine: evidence for a highly evolved active site. *Biochimica et Biophysica Acta – Proteins and Proteomics* 1774: 1519-1527.
15. M. J. Jourden*, M. J. Thomenius*, P. R. Geiss*, L. A. Horst*, M. M. Barty*, G. B. Mulligan*, R. M. Almeida*, B. A. Kersteen*, N. R. Myers*, M. J. Snider, C. L. Borders, Jr., P. L. Edmiston (2005) Transition state stabilization by six arginines clustered in the active site of creatine kinase. *Biochimica et Biophysica Acta – Proteins and Proteomics* 1751: 178-183.

14. C. H. Borchers, V. E. Marquez, G. K. Gottfried, S. E. Short, M. J. Snider, P. Speir and R. Wolfenden (2004) Fourier transform ion cyclotron resonance mass spectrometry reveals the presence of a water molecule in an enzyme-transition state analogue complex. *Proceedings of the National Academy of Sciences – USA* 101: 15341-15345.
- Review 13. M. Snider, B. Temple and R. Wolfenden (2004) The path to the transition state in enzyme reactions: a survey of catalytic efficiencies. *Journal of Physical Organic Chemistry* 17: 586-591.
12. C. L. Borders, Jr., K.M. MacGregor*, P. L. Edmiston, E. R. K. Gbeddy*, M. J. Thomenius*, G. B. Mulligan*, and M. J. Snider (2003) Asparagine 285 plays a key role in transition state stabilization in rabbit muscle creatine kinase. *Protein Science* 12: 532-537.
11. J.M. Cox*, C.A. Davis*, C. Chan*, M.J. Jourden*, A.M. Jorjorian*, M.J. Brym*, M.J. Snider, C.L. Borders, Jr., P.L. Edmiston (2003) Generation of an active site monomer of rabbit muscle creatine kinase by site-directed mutagenesis: the effect of quaternary structure on catalysis and stability. *Biochemistry* 42: 1863-1871.
10. C. L. Borders, Jr., M. J. Snider, R. Wolfenden, and P. L. Edmiston (2002) Determination of the affinity of each component of a composite quaternary transition-state analog complex of creatine kinase. *Biochemistry* 41: 6995-7000.
9. M. J. Snider, D. Lazarevic, and R. Wolfenden (2002) Catalysis by entropic effects: the action of cytidine deaminase on 5,6-dihydrocytidine. *Biochemistry* 41: 3925-3930
8. M. J. Snider, L., Reinhardt, R. Wolfenden, and W. W. Cleland (2002) ¹⁵N kinetic isotope effects on uncatalyzed and enzymatic deamination of cytidine. *Biochemistry* 41: 415-421.
- Review 7. R. Wolfenden and M. J. Snider (2001) The depth of chemical time and the power of enzymes as catalysts. *Accounts of Chemical Research* 34: 938-945.
6. M. J. Snider and R. Wolfenden (2001) Site-bound water and the shortcomings of a less-than-perfect transition state analogue. *Biochemistry* 40: 11364 - 11371.
5. B. G. Miller, M. J. Snider, R. Wolfenden, and S. A. Short. (2001) Dissecting a charged network at the active site of orotidine 5'-monophosphate decarboxylase. *Journal of Biological Chemistry* 276:15174-15176.
4. M. J. Snider and R. Wolfenden (2000) The rate of spontaneous decarboxylation of amino acids. *Journal of the American Chemical Society* 122: 11507-11508.
3. M. J. Snider, S. Gaunitz, C. Ridgway, S. A. Short, and R. Wolfenden (2000) Temperature effects on the catalytic efficiency, rate enhancement, and transition state affinity of cytidine deaminase, and the thermodynamic consequence for catalysis of removing a substrate 'anchor'. *Biochemistry* 39: 9746-9753.
2. B. G. Miller, M. J. Snider, S. A. Short, and R. Wolfenden (2000) Contribution of enzyme-phosphoryl contacts to catalysis by orotidine 5'-phosphate decarboxylase. *Biochemistry* 39: 8113-8118.
1. R. Wolfenden, M. Snider, C. Ridgway, and B. Miller (1999) The temperature dependence of enzyme rate enhancements. *Journal of the American Chemical Society* 121: 7419-7420.

PRESENTATIONS AT PROFESSIONAL MEETINGS (*College of Wooster Undergraduate; presenter)

Mark J. Snider, Scott W. Perkins*, Ryan G. Campbell*, and Lauren Rajakovich; Critical role for substrate ionization in the mechanism of 6-hydroxynicotinate 3-monooxygenase. *Gordon Research Conference on Enzymes, Coenzymes and Metabolic Pathways*, July 2019.

Scott W. Perkins* and Mark J. Snider (2019) Mechanism of 6-hydroxynicotinate 3-monooxygenase (NicC), a flavin-dependent decarboxylative hydroxylase involved in aerobic nicotinic acid catabolism. *26th Enzyme Mechanisms Conference*. New Orleans, LA

Scott W. Perkins* and Mark J. Snider (2018) Investigating putative key catalytic residues and uncoupled hydroperoxyflavin formation in the mechanism of 6-hydroxynicotinate-3-monooxygenase, a decarboxylative-hydroxylase in bacterial nicotinate catabolism; *FASEB J* **32**:655.13

[Honorable Mention for Best Poster Winner in Metabolism and Bioenergetics Section of the ASBMB National Undergraduate Poster Competition]

Kent Nakamoto*, Selim Gerislioglu, and Mark J. Snider (2018) Determining the mechanism of 6-hydroxynicotinate 3-monooxygenase (NicC), an enzyme involved in nicotinate degradation; *FASEB J* **32**:655.14

Nathan Browstein*, and Mark J. Snider (2018) Expression and functional characterization of active nicotinic acid dehydrogenase from *Pseudomonas fluorescens* Pf5; *FASEB J* **32**:796.8

Sydney Fine*, and Mark J. Snider (2018) Elucidating the Role of a Putative Monooxygenase in the Catabolism of Nicotinic Acid and Nicotine by *Bacillus niacini*; *FASEB J* **32**:536.4

Kaeli Zoretich*, Sydney Fine*, and Mark J. Snider (2018) The Catabolism of Nicotinic Acid and Nicotine and the Role of a Putative Monooxygenase in *Bacillus niacini*; *FASEB J* **32**:536.6

Kent Nakamoto*, Scott W. Perkins*, and Mark J. Snider (2018) Determining the mechanism of 6-hydroxynicotinate 3-monooxygenase (NicC). Meeting-in-Miniature, Cleveland Section of the American Chemical Society, Oberlin College, March 2018.

Scott W. Perkins*, Kent Nakamoto* and Mark J. Snider (2017) Investigating the role of covalent intermediates in the mechanism of 6-hydroxynicotinic acid 3-monooxygenase, a decarboxylative-hydroxylase in bacterial nicotinate catabolism; *Midwest Enzyme Chemistry Conference*, Loyola University of Chicago, October 2017.

Kathleen Kalafatis* and Mark J. Snider (2017) Characterization of the nicotinic acid and 6-hydroxynicotinic acid dehydrogenase complexes in *Bacillus niacini*; *FASEB J* **31**:919.3

Tsun Ki Jerrick To* and Mark J. Snider (2017) Genetic and functional characterization of the enzyme of nicotinic acid degradation in *Bacillus niacini*. *FASEB J* **31**:624.6

Laura Sherer*, Mark Snider, Maria Eirini Pandelia, and Roger Rowlett (2017) Cofactor analysis of nicotinate dehydrogenase and 6-hydroxynicotinate dehydrogenase in *Bacillus niacini*. *FASEB J* **31**:919.4

Mark J. Snider and Katherine Hicks; Structural and mechanistic studies of 6-hydroxynicotinic acid 3-monooxygenase: A novel decarboxylative hydroxylase in bacterial nicotinate catabolism. *25th Enzyme Mechanisms Conference*, St. Pete Beach, FL, January 2017.

Katherine A. Hicks, Meigan E. Yuen, Wei Feng Zhen, Anna M. Szostek, Tyler J. Gerwig*, Ryan W. Story*, Matthew R. Bauerle*, Alvi Sakib* and Mark J. Snider; Characterization of the catalytic

mechanism of NicC, a 6-hydroxynicotinic acid 3-monooxygenase; *Gordon Research Conference on Enzymes, Coenzymes and Metabolic Pathways*, July 2016.

Mark J. Snider; Structures and mechanisms of nicotinate catabolizing enzymes: A model system for investigating bacterial *N*-heterocyclic aromatic compound degradation and for undergraduate education. Central Eastern Regional Meeting of the American Chemical Society; Covington, KY, May 2016.

Nicholas P. Lesner*, Michael T. Peterson, and Mark J. Snider (2016) Characterization and Identification of Metabolites in the Oxidation of Nicotinic Acid by *Bacillus Niacini*. *FASEB J* **30**:834.9

Morgan A Dasovich*, Mark J Snider, and Michael T Peterson (2016) Characterization of a Novel Flavin-dependent Monooxygenase in *Bacillus niacini*. *FASEB J* **30**:834.8

Jessica A Meek*, Laura A Sherer*, and Mark J Snider (2016) Deciphering the Metal Dependency of Novel Nicotinate Hydroxylase from *Bacillus niacini*. *FASEB J* **30**:1083.13

Meigan E. Yuen, Weifeng Zhen, Megan C. Kopp, Tyler Gerwig*, Mark J. Snider, and Katherine A. Hicks (2015) Structural and Biochemical Characterization of *Pseudomonas putida* KT2440 NicC, a 6-Hydroxynicotinic Acid 3-Monooxygenase. Annual Meeting of the American Crystallographic Association.

Tyler J Gerwig*, Meigan Yuen, Weifeng Zhen, Mark A Anderson, Katherine Hicks and Mark J Snider (2015) Structure and mechanism of 6-hydroxynicotinate 3-monooxygenase (NicC). *FASEB J* **29**:572.23.

Abigail K Daniel* and Mark J Snider (2015) Elucidating the nicotinic acid degradation pathway in *Bacillus niacini*; *FASEB J* **29**:573.19.

Lauren Buyan* and Mark J Snider (2015) Virulence modulation of *Bordetella pertussis* via inhibition of the nicotinate degradation pathway. *FASEB J* **29**:LB201.

Gentry J Kerwood*, Manish Aryal*, Brittany Van Houten*, Dean M Fraga and Mark Snider (2015) Exploring the structural basis for negative cooperativity in the phosphagen kinase superfamily. *FASEB J* **29**:724.12.

Karan Malani* and Mark J. Snider (2015) Inhibition and kinetic isotope effect studies to further characterize the mechanism of maleamate amidohydrolase. *FASEB J* **29**:572.13.

M. J. Snider, Z. Harvey*, H. Kondow*, P. Chiaranunt*, and M. Anderson; Mechanistic studies of nicotinate degrading enzymes and the identification of a novel nic cluster in *Bacillus niacini*; *Enzyme Structure and Function - 37th Steenbock Symposium*, University of Wisconsin – Madison, WI; May 2014.

H. Kondow*, and M. J. Snider (2014) Investigation of *B. bronchiseptica* maleamate amidohydrolase (NicF) substrate specificity. *FASEB J* **28**:584.3.

M. Aryal*, and M. J. Snider (2014) Testing the versatility of the alternating sites of reactivity mechanism in the phosphagen kinases. *FASEB J* **28**:768.11. [**Honorable Mention for Best Poster Winner in DNA & Chromosomes Section of ASBMB National Undergraduate Poster Competition**]

P. Chiaranunt*, J. Sprano*, A. Daniels* and M. J. Snider (2014) Investigation of the nicotinate degradation pathway in *Bordetella pertussis* and its connections to whooping cough. *FASEB J* **28**:LB266.

Z. Harvey* and M. J. Snider (2014) Functional genomic elucidation of nicotinic acid catabolism in *Bacillus niacini*: Towards a metabolic engineering approach to environmental remediation. *FASEB J* **28**:980.2 [**Honorable Mention for Best Poster Winner in Bioenergetics Section of ASBMB National Undergraduate Poster Competition**]

J. B. Claybourne*, E. Shi*, S. Strand, M. Schultz and M. J. Snider (2014) Biodegradation of venlafaxine. *FASEB J* **28**:B289.

M. M. Schultz, M. J. Snider and S. S. Strand (2013) Antidepressants contaminate your water! Investigations to determine whether bacteria can remediate. *Global Liberal Arts Alliance International Conference on Water*, The College of Wooster.

C. Young, M. J. Snider and D. Fraga (2013) A curriculum based on research as pedagogy: A research project-based approach to teaching techniques in BCMB prepares students for senior independent study projects; *ASBMB Special Symposium on Student-Centered Education in the Molecular and Life Sciences*; Seattle University, Seattle, WA.

M. J. Snider, P. Chiaranunt*, E. Sullivan*, K. Morrison, and D. Hilmey (2013) Investigating the catalytic role of Cys150-Asp29-Lys117 in the mechanism of maleamate amidohydrolase. *FASEB J* **27**:1b62.

M. R. Bauerle*, W. Ammons*, K. Shvets* and M. J. Snider (2012) Analysis of substrate specificity of 6-hydroxynicotinate-3-monooxygenase (NicC) from *Bordetella bronchiseptica*. *FASEB J* **26**:963.13

S. Justice* and M. J. Snider (2012) Investigation of the potential role of 6-hydroxynicotinate monooxygenase in the modulation of virulence in *Bordetella pertussis*. *FASEB J* **26**:731.8

J. E. Noel*, N. E. Spittle* and M. J. Snider (2012) On the role of Cys150 in the mechanism of maleamate amidohydrolase (NicF). *FASEB J* **26**:756.20

Brittany Begres*, A. Palmer*, J. V. Houten*, M. J. Snider, and D. Fraga (2012) Characterization of a hypotaucyamine kinase from the protozoan, *Phytophthora sojae*, and its implications on the evolution of substrate specificity in the phosphagen kinase family. *FASEB J* **26**:963.12

M. J. Snider, M. Bauerle*, W. Ammons*, K. Shvets*, and E. Sullivan*; Aerobic catabolism of nicotinic acid (vitamin B₃) in *Bordetella bronchiseptica*: mechanistic studies of NicC and NicF; *Midwest Enzyme Chemistry Conference*, The University of Chicago; Oct. 2011.

M. T. Henke* and M. J. Snider; A mechanistic proposal for extradiol-like hydroquinone dioxygenases; *Midwest Enzyme Chemistry Conference*, The University of Chicago; Oct. 2011.

J. Van Houten*, A. Palmer*, K. Herring*, M. J. Snider, and D. Fraga (2011); Characterization of the *Phytophthora sojae* hypotaucyamine kinase suggests early evolution of quaternary structure in the phosphagen kinase family. *FASEB J* **25**:928.14

M. J. Snider, B. A. Palanski*, Z. Rotter*, and X. Li (2011); Identification of the ligands of TM0486 from *Thermotoga maritima* by ESI-TOF mass spectrometry suggests role in a novel thiamin salvage pathway. *FASEB J* **25**:923.4

M. T. Henke* and M. J. Snider (2011); Mechanistic studies of 2,5-dihydroxypyridine 5,6-dioxygenase (NicX) from *Bordetella bronchiseptica*. *FASEB J* **25**:714.2

E. D. Sullivan* and M. J. Snider (2011); Mechanistic studies of maleamate amidohydrolase (NicF) from *Bordetella bronchiseptica*. *FASEB J* **25**:714.7

R. Klein*, R. S. Rowlett, and M. J. Snider (2011); Structural studies of maleamate amidohydrolase (NicF) from *Bordetella bronchiseptica*. *FASEB J* **25**:714.4

M. Bauerle*, R. Story*, and M. J. Snider (2011); Mechanistic studies of 6-hydroxynicotinate 3-monoxygenase (NicC) from *Bordetella bronchiseptica*. *FASEB J* **25**:715.2

M. J. Snider, B. A. Palanski*, A. Young* and Z. Rotter*; Guilt by association: functional annotation of TM0486 from *Thermotoga maritima* by identification of its bound ligands. *22nd Enzyme Mechanisms Conference*, St. Petersburg, FL, January 2011.

M. J. Snider, E. Sullivan*, M. Henke*, R. Klein*, M. Bauerle*, V. Kincaid*, R. Story* and R. Rowlett; Aerobic catabolism of nicotinic acid in *Bordetella bronchiseptica*: mechanistic studies of NicC, NicF and NicX. *22nd Enzyme Mechanisms Conference*, St. Petersburg, FL, January 2011.

K. A. Stencel*, M. Krasnor*, C. K. Koechli*, S. S. Strand, M. J. Snider and M. M. Schultz; Transformation of sertraline by aerobic sludge; *Proceedings of the 31st Society of Environmental Toxicology and Chemistry North American Meeting*, Portland, OR, November 2010.

E. A. Sakach*, M. J. Snider, H. L. Schoenfuss, M. M. Schultz; Accumulation of antidepressant pharmaceuticals in fish; *Proceedings of the 31st Society of Environmental Toxicology and Chemistry North American Meeting*, Portland, OR, November 2010.

A.K. Palmer*, D. Fraga, M. Snider and P. Edmiston (2010) Characterization of a dimeric arginine kinase in the protozoan, *Phytophthora sojae*, suggests an early origin of phosphagen kinase dimers. *FASEB J.* **24**:469.7

V.A. Kincaid* and M.J. Snider (2010) Nicotinic acid degradation in *Bordetella bronchiseptica*: mechanistic studies of the novel enzyme NicF. *FASEB J.* **24**:835.7 [**Honorable Mention for Best Poster Winner in Protein Section of ASBMB National Undergraduate Poster Competition**]

B.A. Palanski* and M.J. Snider (2010) Guilt by association: functional annotation of TM0486 from *Thermotoga maritima* by identification of its bound ligands. *FASEB J.* **24**:518.3 [**Honorable Mention for Best Poster Winner in Systems Biology Section of ASBMB National Undergraduate Poster Competition**]

M. J. Snider; Negative cooperativity in transition state binding enhances rate of product release in phosphagen kinases; *40th Central Regional Meeting of the American Chemical Society*; Columbus, OH; June 2008.

M. P. McGinley*, D. Fraga and M. Snider (2008) Evolution of cooperativity in the phosphagen kinase family. *FASEB J.* **22**: 1004.3

V. M. Andrus*, D. Thomas*, T. Meulia, M. Snider, and D. Fraga (2008) Characterization of the arginine kinase family of *Caenorhabditis elegans*. *FASEB J.* **22**: 1004.4

C. Clarke*, and M. J. Snider (2007) Rate of spontaneous hydrolysis of creatine to estimate the catalytic proficiency of creatine amidinohydrolase. *FASEB J.* **21**: 650.5

S. Agidi*, and M. J. Snider (2007) Catalytic role of His232 in the mechanism of *Pseudomonas putida* creatine amidinohydrolase. *FASEB J.* **21**: 805.2

D. H. Thomas*, and M. J. Snider (2007) Investigating the physiological roles and intracellular localization of an arginine kinase in *Caenorhabditis elegans*. *FASEB J.* **21**: 510.11

J. Graham*, and L. Stetzik*, M. J. Snider; Investigating cooperative ligand binding by rabbit muscle creatine kinase using isothermal titration calorimetry. *Midwest Enzyme Chemistry Conference*, Northwestern University, IL, September 2006.

M. J. Snider, I. Lee, I. Eccles-James*, J. Anquandah*, J. Graham*, and L. Stetzik*; Dimerization enhances rate of product release in phosphagen kinase family. *Gordon Research Conference on Enzymes, Coenzymes and Metabolic Pathways*, University of New England, ME. July 2006.

J. Anquandah*, I. G. Eccles-James*, I. N. W. Lee, and M. J. Snider (2006) A mechanistic role for protein oligomerization in the phosphagen kinase family. *FASEB J.* **20**: A44-a

E. E. Gustely* and M. J. Snider (2006) Analysis of the role of His232 in the mechanism of *Ps. putida* creatinase. *FASEB J.* **20**: A43-d

H.-D. Nguyen*, and M. J. Snider (2006) Is the ATP analogue adenosine 5'-sulfatopyrophosphate an alternative substrate or inhibitor of creatine kinase? *FASEB J.* **20**: A43-b

B. D. Pipitone*, and M. J. Snider (2006) Determining the subcellular localization of a novel arginine kinase in *Caenorhabditis elegans*. *FASEB J.* **20**: A900-b

L. A. Horst*, Z.-M. Tun*, J. B. Tout*, M. J. Jourden*, J. A. Bayuk*, J. M. Shear*, M. J. Snider; Thermodynamic analysis of substrate binding and activation by rabbit muscle creatine kinase. *19th Enzyme Mechanisms Conference*, Pacific Grove, CA, January 2005.

M. R. Buckley*, V. Miraldi*, M. J. Snider; Rate of spontaneous phosphoryl transfer between ATP and creatine. *227th ACS National Meeting*; Anaheim, CA, March 2004.

C. Chan*, M. J. Snider, W. S. Kirk, W. W. Cleland; Primary ¹⁸O kinetic isotope effects on phosphoryl transfer by creatine kinase. *227th ACS National Meeting*; Anaheim, CA, March 2004.

J. J. Ellinger*, M. J. Snider, W. S. Kirk, W. W. Cleland; Primary ¹⁸O kinetic isotope effects for arginine kinase-catalyzed phosphoryl transfer from ATP. *227th ACS National Meeting*; Anaheim, CA, March 2004.

D. E. Freeman*, M. J. Snider; Is creatine kinase catalytically promiscuous? *227th ACS National Meeting*; Anaheim, CA, March 2004.

J. E. Hall*, M. J. Snider; Biochemical characterization of a *Caenorhabditis elegans* arginine kinase. *227th ACS National Meeting*; Anaheim, CA, March 2004.

R. Wolfenden, M. J. Snider; A transition state analogue complex in the vapor phase; *18th Enzyme Mechanisms Conference*; Galveston Island, TX, January 2003.

M. Borders, M. J. Snider, Geiss, P.R.*, Jourden, M.J.*, Kersteen, E.A.*, Moore, N.R.*, McBride, L.C.*, Rohan, M.C.*, Almeida, R.M.*, Gbeddy, E.R.K.*, Mulligan, G.B.*, MacGregor, K.M.*, Lake, B.A.*, Bohl, J.L.*, Terrano, D.T.*, Edmiston, P.L.; Creatine kinase is more than positive about it: roles of each component of a six-arginine cluster at the active site in binding and catalysis; *18th Enzyme Mechanisms Conference*; Galveston Island, TX, January 2003.

J. M. Rackley*, C. L. Borders, Jr., M. J. Snider; Temperature dependence of the catalytic activity of rabbit muscle creatine kinase; *16th National Conference on Undergraduate Research*, University of Wisconsin - Whitewater, WI, April 2002.

D. R. Korstjens*, M. J. Snider, C. L. Borders, Jr.; Renaturation of insoluble mutants of creatine kinase; *16th National Conference on Undergraduate Research*, University of Wisconsin - Whitewater, WI, April 2002.

R. Wolfenden, Mark J. Snider; Site-bound water and the limitations of a potential transition state analogue inhibitor; *Gordon Research Conference on Enzymes, Coenzymes and Metabolic Pathways*, Meriden, NH, July 2001.

M. J. Snider, R. Wolfenden; Thermodynamic role of site bound water in transition state and transition state analogue binding by cytidine deaminase; *17th Enzyme Mechanisms Conference*; Marco Island, FL, January 2001.

M. J. Snider, S. Gaunitz, C. Ridgway, R. Wolfenden; Temperature dependence of the transition state affinity of cytidine deaminase; *219th ACS National Meeting*; San Francisco, CA, March 2000.

INVITED RESEARCH TALKS

2017	Dept. of Chemistry, SUNY-Buffalo
2016	Central Regional American Chemical Society Meeting, Covington, KY.
2013	Natural Science Division, Rio Grande University, OH
2012	Dept. of Chemistry, University of Toledo, OH
2011	Dept. of Chemistry & Biochemistry, Denison University, OH Dept. of Physiology and Biophysics, Case University, Cleveland, OH
2009	Dept. of Biochemistry & Biophysics, U. North Carolina - Chapel Hill
2008	Dept. of Chemistry, Capital University 40th Central Regional Meeting of the American Chemical Society; Symposium in honor of Prof. Ming-Daw Tsai; Columbus, OH Dept. of Chemistry, Ithaca College, Ithaca NY Dept. of Biol. & Chem. Sciences, Wells College, Aurora, NY
2007	Dept. of Chemistry, The Ohio State Univ., Columbus, OH
2006	Dept. of Biochemistry & Molecular Biol., Pennsylvania State Univ. Dept. of Chemistry, The Univ. of Akron Begley Laboratory, Cornell Univ.
2005	Dept. of Chemistry, Michigan State Univ. Dept. of Biochemistry & Biophysics, Univ. North Carolina – C.H.
2004	The Wooster Section of the American Chemical Society; at Ashland Univ.
2003	Dept. of Medicinal Chem & Mol. Pharm., Purdue Univ. Dept. of Chemistry, Capital Univ.
2002	Dept. of Chemistry, Beloit College Dept. of Chemistry, John Carroll Univ. Dept. of Chemistry, Middlebury College Wooster Area Molecular Biology Association, Ohio Agricultural Research & Development Center, OSU.
2001	Structural Biology & Biotechnology Symposium, Chapel Hill, NC

PROFESSIONAL MEMBERSHIPS

American Society for Biochemistry & Molecular Biology	2005–
American Chemical Society: Biological Division & Chemical Education	1993–
Council on Undergraduate Research	1999–2007

COURSES TAUGHT AT THE COLLEGE OF WOOSTER (*course taught regularly)

Controversies in Science and Public Policy (Chemistry 103; chemistry course for non-science majors)
First-Year Seminar in Critical Inquiry (Interdepartmental writing intensive course for incoming students)
General Chemistry I (CHEM 111)
*General Chemistry II and Laboratory (CHEM 112)
Organic Chemistry Laboratory (CHEM 211L and 212L)
Organic Chemistry II (CHEM 212)
*Techniques in Biochemistry & Molecular Biology (BCMB 303)
*Principles of Biochemistry (BCMB 331)
*Biochemistry of Metabolism (BCMB 332)
Biophysical Chemistry (CHEM 334)
Advanced Biochemistry Tutorials (BCMB 400)
Chemistry Tutorial: The Life and Death of a Molecule (CHEM 400)
*Introduction to Independent Study (BCMB 401)
*Senior Independent Study (CHEM & BCMB 451/452)

SERVICE AT THE COLLEGE OF WOOSTER

Biochemistry & Molecular Biology Curriculum Committee, <i>Chairperson</i>	2002-present 2008-2011
College of Wooster Scholarships at State Science Day, <i>Judging Chairperson</i>	2001-2007; 2009-2010; 2014 2001-2007
College Scholars Examination Committee	2001-2004
Department of Chemistry <i>Chairperson</i>	2013-2016
EPC Sub-Committee for Assessing Quantitative Reasoning Courses	2006
Faculty Development Committee	2008-2009
Faculty Research & Study Leaves Committee	2008-2009
Financial Advisory Committee (elected)	2004-2006
Five-Year Strategic Planning, Priorities Advisory Committee (elected)	2004
Henry J. Copeland Funds for Independent Study Committee	2002-2004; 2006-2007
Howard Hughes Medical Institute Steering Committee	2011-present
Interfaith Campus Ministries Advisory Board	2003-2007
Life Sciences Planning Committee and Ruth W. Williams Hall of Life Science Facility <i>Co-Building Shepherd</i>	2011-present 2013-present
Pre-Health Advisory Committee	2003-2007
Teaching Staff and Tenure Committee (elected) <i>Co-Chair</i> (with Provost)	2009-2012; 2019-present 2011-2012
Upperclassman Programs Committee	2003-2004
Wellness Program Committee	2006-2007

SCHOLARLY COMMUNITY SERVICE

Scientific Judge at the ASBMB National Undergraduate Poster Competition	April 2018
NSF Grant Proposal Review Panel	March 2017
Curriculum Reviewer for Department of Chemistry, Elon University	April 2016
Preparing Future Faculty (Ohio State University) Mentor	2009 – 2010
Instructor, B-WISER Summer Camp	June 2006
Chemistry Faculty Mentor, Council of Undergraduate Research	2006 – 2008
Technical Expert, Wayne County Local Emergency Planning Committee	2011– 2013

PEDAGOGICAL DEVELOPMENT

ASBMB Regional Workshop at The College of Wooster (co-hosted with Dean Fraga) <i>Implementing Vision and Change Using Concept-Driven Teaching Strategies</i>	March 2015
ASBMB Regional Workshop at Kentucky Wesleyan University, Owensboro, KY: <i>Implementing Vision and Change Using Concept-Driven Teaching Strategies</i>	May 2014
ASBMB Special Symposium on Student-Centered Education in the Molecular and Life Sciences; Seattle, WA. Poster presentation entitled (with Crystal Young: <i>A curriculum based on research as pedagogy: A research project-based approach to teaching techniques in BCMB prepares students for senior independent study projects</i>)	August 2013
Wooster Faculty Workshop: First-Year Seminars in Critical Inquiry	May 2011
POGIL Workshop; Washington College; Chestertown, MD	June 2008
American Academy of Colleges & Universities: <i>The importance of institutional, disciplinary, and interdisciplinary definitions of scholarship</i> ; The Student as Scholar: Undergraduate Research and Creative Practice; Long Beach, CA.	April 2007
Hewlett-Mellon Presidential Discretionary Fund for Institutional Renewal: A Comprehensive Examination of Introductory Science and Mathematics Courses	2006-2007
Five Colleges of Ohio Assessment Conference, Wooster, Ohio	February 2006
Project Kaleidoscope National Colloquium: Translating How People Learn into a	

Roadmap for Institutional Transformation; Kansas City, Missouri	October 2005
Wooster Faculty Workshop: First-Year Seminars in Critical Inquiry	May 2004
Wooster Faculty Workshop on Teaching and Learning: "How Well Are Students Learning What We're Teaching?" with Thomas A. Angelo	February 2004
Project Kaleidoscope Assembly: Motivating Students to Pursue Careers in STEM Fields; Oberlin College, Oberlin, Ohio	September 2003
Wooster Faculty Workshop on Writing in the Sciences with J. Pechenik	April 2003
Wooster Faculty Conference on Teaching and Learning	May 2002

SENIOR INDEPENDENT STUDY THESIS RESEARCH ADVISEES (61)

- Davin R. Korstjens** (2001-02; Biochemistry) The attempted refolding of the insoluble rabbit muscle creatine kinase R214K mutant into an active enzyme. [M.S. in BioMedical Sciences, Univ. of Colorado (2005)]
- Jane M. Rackley** (2001-02; Chemistry) The temperature dependence of the catalytic activity of rabbit muscle creatine kinase. [M.Ed. Carlow Univ. (2012); H.S. Chemistry Teacher]
- Jennifer A. Bayuk** (2002-03; Biochemistry) Temperature effects on substrate binding and activation by creatine kinase. [D.O., Kirksville College of Osteopathic Medicine (2008)]
- Virginia A. (Miraldi) Utz** (2002-03; Biochemistry) Development of a quantitative protocol using ³¹P NMR spectroscopy to study the reaction of the spontaneous phosphoryl transfer from MgATP to creatine. [M.D., Case Western Reserve University (2007); Assistant Professor, Department of Ophthalmology, University of Cincinnati]
- Tabetha D. Shelly** (2002-03; Biochemistry) The expression and purification of a *C. elegans* arginine kinase. [Research Scientist, R&D, Leiner Health Products, NC]
- Marshall R. Buckley** (2003-04; BCMB) Progress toward measuring the rate of spontaneous phosphoryl transfer from MgATP to creatine. [MBA, Boston College (2008)]
- Chikio Chan** (2003-04; BCMB) Progress toward measuring primary ¹⁸O kinetic isotope effects on phosphate transfer by creatine kinase. [Ph.D., Biochemistry, Yale University (2010)]
- James J. Ellinger** (2003-04; BCMB) Determining the rate-limiting step of the reaction catalyzed by *Stichopus japonicus* arginine kinase by viscosity variation. [Ph.D., Biochemistry, Univ. of Wisconsin (2012)]
- Dena E. Freeman** (2003-04; BCMB) Is creatine kinase catalytically promiscuous?: synthesis, purification and kinetic analysis of adenosine 5'-sulfatopyrophosphate as a potential substrate for creatine kinase. [MPH, Univ. of Washington (2008)]
- Joseph E. Hall** (2003-04; BCMB) Biochemical characterization of a novel *Caenorhabditis elegans* arginine kinase through linked-enzyme kinetic assay analysis. [M.D., Univ. of Cincinnati (2008); ENT Fellow, Vanderbilt Univ.]
- Ijeoma G. Eccles-James** (2004-05; BCMB) Investigating a catalytic role of dimerization for creatine kinase. [M.Sc. in Immunology, Imperial College, London, UK (2007); Research Associate, UC-SF]
- Jennifer L. Shrock** (2004-05; BCMB) Exploring the amino acid determinants of cooperative transition state binding by creatine kinase. [BSN, Regis University (2010)]
- Jason B. Tout** (2004-05; Chemistry) Thermodynamic changes accompanying the binding of MgADP in a composite, quaternary transition state analogue complex by creatine kinase. [M.Ed., Boston College (2008); High school science teacher]
- Lauren M. Wagner** (2004-05; BCMB) Exploring the cellular localization of a novel arginine kinase in *Caenorhabditis elegans* by fluorescence microscopy. [Ph.D., Molecular Biology, Univ. of Pittsburgh (2012)]

- Juliana Anquandah** (2005-06; BCMB) Investigating a mechanistic role for protein oligomerization in the phosphagen kinase family. [M.D., St. George's University, Grenada, West Indies (2013); Obstetrics-Gynecology Residency, Oakwood Hospital, MI.]
- Erin E. Gustely** (2005-06; BCMB) Investigating the mechanism of creatinase. [M.S., Biochemistry, Yale University (2007); High school science teacher]
- Hai Dang Nguyen** (2005-06; BCMB) ATP analogue, adenosine 5'-sulfatopyrophosphate: an alternative substrate or inhibitor of creatine kinase? [Ph.D., Biochemistry, Univ. of Minnesota (2012); Post-doctoral Fellow at Harvard Medical School]
- Baldassare Daniel Pipitone** (2005-06, BCMB) Examining the physiological role of an arginine kinase in *Caenorhabditis elegans*. [D.O., Ohio University (2010); Neuro-radiology Fellow, Univ. Michigan (2017); practicing radiologist]
- Perfect Senyo Agidi** (2006-07; BCMB) Kinetic mechanism of *Pseudomonas putida* creatine Amidinohydrolase by isothermal titration calorimetry. [D.O., Nova Southeastern University, Florida (2015)]
- Chafen Clarke** (2006-07; BCMB) Catalytic proficiency of creatine amidinohydrolase [DDS, The University of the West Indies, Jamaica]
- David H. Thomas** (2006-07; BCMB) Determining the sub-cellular localization of an arginine kinase in *Caenorhabditis elegans*. [M.D., Univ. of Cincinnati (2012); Internal Medicine, Case Univ. Hospital]
- Christopher Chapman** (2008-09; Chemistry) Kinetic analysis of spontaneous creatine hydrolysis by ¹H NMR and creatine amidinohydrolase catalyzed creatine hydrolysis by isothermal titration calorimetry. [Chemist at PPG Industries, Inc.]
- Stephanie Edmisson** (2008-09; BCMB) Investigating the role of the IQ67 domain in the interaction between SUN and calmodulin: an endeavor into the treacherous world of protein expression by *Escherichia coli* (under the direction of Dr. Esther van der Knaap) [High School Biology Teacher]
- Theodore Moore III** (2008-09; BCMB) Characterization of a putative monooxygenase involved in NAD catabolism. [Ph.D., (2015) Microbiology, Univ. Wisconsin-Madison; Post-doctoral Fellow, MIT]
- Allyson Palmer** (2009-10; BCMB) Expression and characterization of *Phytophthora sojae* phosphagen kinases [M.D./Ph.D. (2018), The Mayo Clinic, MN]
- Ryan W. Story** (2009-10; BCMB) NAD catabolism: identification of a 6-hydroxynicotinate 3-monooxygenase in *Bordetella bronchiseptica* [M.D., The Ohio State University (2014), Residency at Vanderbilt University]
- Virginia Kincaid** (2009-10; Chemistry) Nicotinic acid degradation in *Bordetella bronchiseptica*: kinetic studies of the hydrolytic deamidase NicF. [Ph.D. Biochemistry (2017) Univ. of Wisconsin – Madison; Post-Doctoral Fellow at Promega]
- David Flannelly** (2009-10; Chemistry) Wastewater, the new lipstick in feminization: the analytical determination of a range of endocrine disruptors in the Chicago watershed. [Teach for America Program; Ph.D. student, Environmental Toxicology/Chemistry, Cornell University]
- Roger D. Klein** (2010-11; A.C.S.-Certified Chemistry/Biochemistry, BCMB, & Physics) A structure-function analysis of maleamic acid amidinohydrolase (NicF) from *Bordetella bronchiseptica* [M.D./Ph.D. student, Washington University, St. Louis]
- Matthew T. Henke** (2010-11; BCMB) Developing a mechanistic proposal for 2,5-dihydropyridine-5,6-dioxygenase (NicX) from *Bordetella bronchiseptica*. [Ph.D. (2016) Integrative Biological Sciences, Northwestern University; Post-Doctoral Fellow, Harvard University]
- Brad A. Palanski** (2010-11; A.C.S.-Certified Chemistry/Biochemistry) An investigation of the ability of *Pseudomonas fluorescens* to degrade the antidepressant sertraline (Zoloft®) [Ph.D. (2018), Chemistry, Stanford University; Post-Doctoral Fellow, Harvard University]
- Eric D. Sullivan** (2010-11; BCMB) Mechanistic studies of maleamate amidohydrolase (NicF) from *Bordetella bronchiseptica* RB50. [Ph.D. (2016), Chemical Biology, University of Michigan; Post-

- doctoral Fellow, NIEHS, Raleigh, NC]
- Matthew R. Bauerle** (2011-12; A.C.S.-Certified Chemistry) Structure-function analysis of 6-hydroxynicotinate 3-monooxygenase. [Ph.D. (2018), Chemistry, Pennsylvania State University; Senior Research Chemist, Exemplify Biopharma, Inc.]
- Jonathon Fox** (2011-12; BCMB) Isolation of bacterial strains in wastewater sludge capable of degradation of sertraline, venlafaxine and triclocarban. [applying to MS programs in biomedical engineering]
- Samantha Justice** (2011-12; BCMB) Investigation of the potential role of 6-hydroxynicotinate-3-monooxygenase in the modulation of virulence in *Bordetella pertussis*. [Ph.D. student, Biological and Biomedical Sciences, Univ. Southern California]
- Jeffrey E. Noel** (2011-12; BCMB) Investigation in the catalytic mechanism of maleamate amidohydrolase (NicF) from *Bordetella bronchiseptica* RB50. [employed]
- Nicholas E. Spittle** (2011-12; BCMB) Probing the role of cysteine-150 in maleamate amidohydrolase (NicF) catalysis from *Bordetella bronchiseptica* RB50 by site-directed mutagenesis. [D.O. (2016) Ohio University College of Osteopathic Medicine]
- Zachary Harvey** (2013-14; A.C.S.-Certified Chemistry/Biochemistry) Defining the Genome and Nic Cluster of *Bacillus niacini*. [Ph.D. student, Chemical & Systems Biology, Stanford University]
- Manish Aryal** (2013-14; BCMB) Evolution of negative cooperativity in phosphagen kinases [Ph.D. student, Molecular Biophysics and Structural Biology Program, Carnegie Mellon / Univ. Pittsburgh]
- Pailin Chairanunt** (2013-14; BCMB & Philosophy) A scientific paradigm shift from reductionism to holism: the potential relationship between nicotinate degradation and virulence modulation in *Bordetella pertussis* [Ph.D. student, Immunology, University of Toronto, Canada]
- Helena Kondow** (2013-14; BCMB) Elucidation of *Bordetella bronchiseptica* maleamate amidohydrolase (NicF) substrate specificity. [Ph.D. student, Biochemistry & Biophysics, Texas A&M University]
- Jacob Sprano** (2013-14; BCMB & History) Pertussis, pellagra, and poverty: a historical and scientific analysis of whooping cough's associations with poverty and pellagra, and the nicotinate degradation pathway in *Bordetella pertussis*. [D.O. student, Kansas City University of Medicine and Biosciences]
- James Claybourne** (2013-14; Neuroscience/BCMB) An analysis of the bioremediation of venlafaxine using aerobic bacteria. [applying to law school]
- Lauren Buyan** (2014-15; Neuroscience/BCMB) Virulence modulation of *Bordetella pertussis* via inhibition of the nicotinate degradation pathway. [D.O. student, College of Osteopathic Medicine of the Pacific Northwest, Oregon]
- Abigail Daniel** (2014-15; BCMB) Cloning and expression of the novel proteins in the *Bacillus niacini* nicotinic acid degradation pathway and an initial attempt to characterize the NicAB complex. [Apprenticeship in sustainable agriculture, Philadelphia, PA; applying to MPH programs]
- Tyler Gerwig** (2014-15; Chemistry) Assessing mechanistic proposals of 6-hydroxynicotinate-3-monooxygenase (NicC) from *B. bronchiseptica*. [D.O. (2019) Ohio University College of Osteopathic Medicine]
- Karan Melani** (2014-15; BCMB) Inhibition and kinetic isotope effect studies to further characterize the mechanism of maleamate amidohydrolase (NicF). [D.P.M. student, Temple University]
- Alvi Sakib** (2016; BCMB) Investigating the proposed acid-base catalyzed mechanism for 6-hydroxynicotinate 3-monooxygenase (NicC) [M.B.A. (2018) University of Michigan]
- Morgan Dasovich** (2015-16; BCMB) The partial characterization of a monooxygenase in *Bacillus niacini* [Ph.D. student, Chemical Biology, Johns Hopkins University]
- Melia Kovach** (2015-16; BCMB) Generation of a Δ nicC *Bordetella pertussis* mutant: investigating the relationship between nicotinic acid degradation and virulence modulation. [clinical research lab

- technician, Univ. Virginia HIV Clinic; applying to PA/MPH programs]
- Nicholas Lesner** (2015-16; A.C.S.-certified Chemistry) Attempted synthesis of 2,3,6-trihydroxypyridine and characterization of the putative ring-cleavage enzyme in *Bacillus niacini* nicotinate catabolism. [Ph.D. student, Biochemistry and Biophysics, Univ. of Texas – Southwest Medical Center]
- Dylan McCreary** (2015-16; A.C.S.-certified Chemistry) Investigation of the functionality of the nicotinic acid degradation pathway of *Bordetella pertussis* as a potential treatment of whooping cough. [M.D. student, Univ. of Minnesota Medical School]
- Jessica Meek** (2015-16; BCMB) Deciphering the metal dependency of novel nicotinic acid dehydrogenases from *Bacillus niacini* [M.D. student, Univ. College Cork School of Medicine, Ireland.]
- Jack Harrington** (2016-17; Chemistry) Elucidating the mechanism of oxidative decarboxylation of 6-hydroxynicotinate by 6-hydroxynicotinate 3-monooxygenase (NicC) through kinetic analysis. [Teaching English in China]
- Kathleen Kalafatis** (2016-17; Neuroscience-BCMB) An attempt to characterize the multi-subunit nicotinic acid and 6-hydroxynicotinic acid dehydrogenase complexes in the nicotinic acid degradation pathway of *Bacillus niacini* [D.O. student, Lincoln Memorial University DeBusk College of Osteopathic Medicine]
- Laura Sherer** (2016-17; BCMB) Biophysical characterization of the cofactors in the putative NicAB complex from *Bacillus niacini*. [Ph.D. student, Univ. of Minnesota]
- Tsun Ki Jerrick To** (2016-17; BCMB) Characterizing the genetic determinants of the nicotinic acid degradation pathway in *Bacillus niacini*. [Ph.D. student, Univ. of Pennsylvania]
- Nathan Brownstein** (2017-18; BCMB) Attempt at expression of a functional recombinant nicotinate dehydrogenase from *Bacillus niacini* [Ph.D. student, Brandeis Univ.]
- Sydney Fine** (2017-18; BCMB) *Niacini*, now you don't: the catabolism of nicotinic acid and nicotine and the role of a putative monooxygenase enzyme [Research Intern, Fred Hutchinson Cancer Center, Seattle, WA]
- Kent Nakamoto** (2017-18; ACS-certified Chemistry) Elucidating the mechanism of 6-hydroxynicotinate 3-monooxygenase, an enzyme involved in aerobic degradation of nicotinate [M.D. student at The Ohio State University]
- Derek Schwarz** (2017-18; BCMB) *Help! Help! I'm being repressed!*: An in-depth analysis of the IclR and its *in vitro* oligomerization [applying to engineering programs]
- Anh Dinh** (2019-20; BCMB)
- Noah Helton** (2019-20; BCMB)
- Brent Pedersen** (2019-20; BCMB)
- Scott Perkins** (2019-20; Neuroscience-BCMB)
- Phillip Plotkin** (2019-20; Neuroscience-BCMB)
- Anneliese Wagoner** (2019-20; BCMB)