Mark J. Snider
Associate Professor of Chemistry

Department of Chemistry
The College of Wooster
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PERSONAL INFORMATION

Home Address:	1534 Christmas Run Blvd. Wooster, Ohio 44691
Cell Phone:	330-466-1535
Date/Place of Birth:	July 7, 1975 Marion, Ohio
Family Status:	Melinda (wife); Elizabeth, Eric, Katherine and David (children)

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: *Thermodynamic Analysis of the Mechanism of Escherichia coli Cytidine Deaminase* © 2001

B.A. 1997 — Chemistry, *summa cum laude*
Capital University, Columbus Ohio

EMPLOYMENT

2012	Honorary Fellow, Department of Biochemistry, University of Wisconsin-Madison (sabbatical)
2008 – 2011	Chairperson, Biochemistry & Molecular Biology Program
2007 – 2008	Visiting Scientist, Department of Chemistry & Chemical Biology, Cornell University (sabbatical)
2007 –	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

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 Abor, 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; genes and mechanistic studies of microbial degradation of antidepressants; characterizing proteins of unknown function through chemical identification of the protein-bound ligands; functional and kinetic characterization of novel phosphagen kinases.

EXTERNALLY-FUNDED RESEARCH GRANTS

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); $125,000

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

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 W. W. Cleland at University of Wisconsin-Madison to complete work on the ^{18}O-kinetic isotope effects to determine the structure of the transition state for phosphoryl transfer catalyzed by phosphagen kinases; $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: 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 Reactions at High Temperature; $1,200

2003: William H. Wilson Award; Acquisition of Reverse-Phase HPLC Columns for Analysis of ^{18}O Kinetic Isotope Effects; $1,400

2003: Elizabeth Ralston Presidential Endowment for Faculty Development Award; $2,500

PEER-REVIEWED PUBLICATIONS (*College of Wooster undergraduate)

A. Palmer*, J. Van Houten*, L. Marcze*, S. Wanner*, M. J. Snider, P. L. Edmiston, and D. Fraga Characterization of a putative hypotaurocyamine kinase from *Phytophthora sojae* : Implications for the evolution of the phosphagen kinase family – *manuscript in progress, to be submitted to Comparative Physiology and Biochemistry; Part B: Biochemistry & Molecular Biology*

M. M. Schultz, C. N. Koechli*, K. A. Stencel*, M. Krasnor*, B. A. Palanski*, M. J. Snider and S. S. Strand. Aerobic degradation of the antidepressant sertraline by *Pseudomonas fluorescens Pf-5; manuscript in revision*.

M. J. Snider, I. Lee, I. Eccles-James*, J. Anquandah*, J. Fishovitz, J. Graham*, R. Klein*, L. Marcze*, L. Stetzik* Inter-subunit communication in creatine kinase: an alternating sites reactivity mechanism for catalysis; *manuscript in revision*.

B. A. Palanski*, N. Radzinski*, X. Li, and M. J. Snider. Identification of the ligands of TM0486 by time-of-flight mass spectrometry suggests role in a novel thiamin salvage pathway– *manuscript in progress - to be submitted to JACS*.

21. G. K. Schroeder, L. Zhou, M. J. Snider, X. Chen, and R. Wolfenden. The flight of a cytidine deaminase complex with an imperfect transition state analogue inhibitor: mass spectrometric evidence of a trapped water molecule. *Submitted to Biochemistry*.

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 B_3) 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. Mccullock, 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 *Desulfotelea 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 glycocyamine: 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**) ^{15}N 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)

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 hypotauracyamine 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 B_3) 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* hypotaurocyamine 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-monooxygenase (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 *Thermatoga 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 nicontinic 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 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 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 catatlyic 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 ^{18}O 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 ^{18}O 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 TALKS

2011	Dept. of Chemistry & Biochemistry, Denison University 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, Columbus, OH 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	American Academy of Colleges & Universities *The importance of institutional, disciplinary, and interdisciplinary definitions of scholarship;* The Student as Scholar: Undergraduate

	Research and Creative Practice. Long Beach, CA.
	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

INVITED TALKS AT THE COLLEGE OF WOOSTER

2010	*Proteins of unknown function*; Science Round Table.
	Biological degradation of sertraline in the environment; Science Round Table.
2009	*Exploring the nuts and bolts of life: biological reactions and their catalysts;* Faculty-at-Large Lecture.
2006	*Sex, Drugs and Enzymes;* Pursuing Scientific Interests
	For the Love of Enzymes; Science Round-Table.
	Drugs: the good, the bad and the ugly; Sci. & Humanities Program.
2003	*From killing weeds to saving lives: the roles of enzyme antagonists;* Wooster Faculty Research Luncheon.
2002	*Thermodynamic analysis of enzyme action: case studies of cytidine deaminase and creatine kinase;* Chemistry Club, Department of Chemistry.
	Making Biological Reactions Possible: The Power of Enzymes as Catalysts; Science Round-Table.
2001	*Enzymes and Graduate Students: Evolved Proficiency & Serendipity;* Pursuing Scientific Interests.

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

Controversies in Science and Public Policy (Chemistry 103; chemistry course for non-science majors)
First-Year Seminar in Critical Inquiry (Interdepartmental writing intensive course)
Introductory College Chemistry I and Laboratory (CHEM 111/110)
Introductory College Chemistry II and Laboratory (CHEM 112/120)
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 333)
Advanced Biochemistry Tutorial (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)

COMMITTEE SERVICE AT THE COLLEGE OF WOOSTER

Biochemistry & Molecular Biology Curriculum Committee,	2002-present
Chairperson	2008-2011
College of Wooster Scholarships at State Science Day,	2001-2007; 2009-2010
Judging Chairperson	2001-2007
College Scholars Examination Committee	2001-2004
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
Pre-Health Advisory Committee	2003-2007
Teaching Staff and Tenure Committee (**elected**)	2009-2012
Chairperson	2011-2012
Upperclassman Programs Committee	2003-2004
Wellness Program Committee	2006-2007

COMMUNITY SERVICE

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 - present
Science Fair Poster Judge, St. Augustine's School, Barberton, OH	February 2005
Faculty Poster Judge, Central Ohio Undergraduate Research Symposium, Kenyon College	November 2001

PEDAGOGICAL DEVELOPMENT

Wooster Faculty Workshop: First-Year Seminars in Critical Inquiry	May 2011
POGIL Workshop; Washington College; Chestertown, MD	June 2008
AAC&U Conference; 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 ADVISEES AND THESIS TITLES

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. [Artist's Diploma, Dequesne Univ. (2006); Science 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 ^{31}P NMR spectroscopy to study the reaction of the spontaneous phosphoryl transfer from MgATP to creatine. [M.D., Case Western Reserve University (2007); Ophthalmology Fellow, CWRU]

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 ^{18}O 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. student, St. George's University, Grenada, West Indies]

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)]

Baldassare Daniel Pipitone (2005-06, BCMB) Examining the physiological role of an arginine kinase in *Caenorhabditis elegans*. [D.O., Ohio University (2010)]

Perfect Senyo Agidi (2006-07; BCMB) Kinetic mechanism of *Pseudomonas putida* creatine Amidinohydrolase by isothermal titration calorimetry. [D.O. student, Nova Southeastern University, Florida]

Chafen Clarke (2006-07; BCMB) Catalytic proficiency of creatine amidinohydrolase [unknown]

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 ^{1}H NMR and creatine amindinohydrolase catalyzed creatine hydrolysis by isothermal titration calorimetry. [Chemist at Catacel Corp.]

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 *Eschericia coli*. [unknown]

Theodore Moore III (2008-09; BCMB) Characterization of a putative monooxygenase involved in NAD catabolism. [Ph.D. student, Microbiology, Univ. Wisconsin-Madison]

Allyson Palmer (2009-10; BCMB) Expression and characterization of *Phytophthora sojae* phosphagen kinases [MD/PhD student at The Mayo Clinic, MN]

Ryan W. Story (2009-10; BCMB) NAD catabolism: identification of a 6-hydroxynicotinate 3-monooxygenase in *Bordetella bronchispectica* [M.D. student, The Ohio State University]

Virginia Kincaid (2009-10; Chemistry) Nicotinic acid degradation in *Bordetella bronchiseptica*: kinetic studies of the hydrolytic deamidase NicF. [Ph.D. student, Biochemistry, Univ. of Wisconsin – Madison]

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; 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-dihydroxypyridine-5,6-dioxygenase (NicX) from *Bordetella bronchiseptica*. [Ph.D. student, Integrative Biological Sciences, Northwestern University]

Brad A. Palanski (2010-11; A.C.S.-Certified Biochemistry) An investigation of the ability of *Pseudomonas fluorescens* to degrade the antidepressant sertraline (Zoloft®) [Ph.D. student, Chemistry, Stanford University]

Eric D. Sullivan (2010-11; BCMB) Mechanistic studies of maleamate amidohydrolase (NicF) from *Bordetella bronchiseptica RB50*. [Ph.D. student, Chemical Biology, University of Michigan]

Matthew R. Bauerle (2011-12; CHEM) Structure-function analysis of 6-hydroxynicotinate 3-monooxygenase. [Ph.D. student, Chemistry, Pennsylvania State University]

Jonathon Fox (2011-12; BCMB) Isolation of bacterial strains in wastewater sludge capable of degradation of sertraline, venlafaxine and triclocarban. [tba]

Samantha Justice (2011-12; BCMB) Investigation of the potential role of 6-hydroxynicotinate-3-monooxygenase in the modulation of virulence in *Bordetella pertussis*. [tba]

Jeffrey E. Noel (2011-12; BCMB) Investigation in the catalytic mechanism of maleamate amidohydrolase (NicF) from *Bordetella bronchiseptica RB50*. [tba]

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. student at Ohio University College of Osteopathic Medicine]