

Jiantao Guo

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EDUCATION AND TRAINING

Postdoctoral *Chemical Biology*, The Scripps Research Institute
Mentor: Professor Peter G. Schultz

Ph.D. *Bioorganic Chemistry*, Michigan State University
Research advisor: Professor John W. Frost

M.S. *Physical Organic Chemistry*, Nankai University
Research advisor: Professor J.-P. Cheng

B.S. *Chemistry*, Nankai University
Research advisor: Professor J.-P. Cheng

PROFESSIONAL APPOINTMENTS

- 2010 - **Assistant Professor**, University of Nebraska-Lincoln
- 2006-2010 **Research Associate**, The Scripps Research Institute
- 2004-2006 **Research Assistant Professor**, Michigan State University

AFFILIATION

American Chemical Society (since 1998)
American Institute of Biological Sciences (since 2008)
Sigma Xi (Since 2009)
American Heart Association (Since 2011)

PUBLICATIONS (Peer Reviewed)

(a) at UNL

22. Shang, X.; **Guo, J.*** "Fluorogenic Bioconjugation Reaction of Styrene and Tetrazine" **2015**, manuscript in preparation. (*corresponding author; 100% contribution)
21. Ju, T.; Niu, W.; **Guo, J.*** "Evolution of SH2 Domain to Recognize Sulfotyrosine" **2015**, manuscript in preparation. (*corresponding author; 100% contribution)
20. Wang, N.; Niu, W.; Cerny, R.; **Guo, J.*** "A Study of UAGN Codon Decoding in a Genomically Recoded Bacterium." **2015**, under revision. (*corresponding author; 100% contribution)
19. Niu, W.*; **Guo, J.*** "Stereospecific Microbial Conversion of Lactic Acid into 1,2-Propanediol" *ACS Synth. Biol.* **2015**, 4, 378-382. (*corresponding author; 50% contribution; Impact Factor, 4.978)

18. Wang, N.; Ju, T.; Niu, W.; **Guo, J.*** "Fine-tuning Interaction between Aminoacyl-tRNA Synthetase and tRNA for Efficient Synthesis of Proteins Containing Unnatural Amino Acids" *ACS Synth. Biol.* **2015**, *4*, 207-212. (*corresponding author; 100% contribution; Highlighted in the Journal's website; Impact Factor, 4.978)
 17. Wang, N.; Li, Y.; Niu, W.; Sun, M.; Cerny, R.; Li, Q.;* **Guo, J.*** "Construction of a Live-Attenuated HIV-1 Vaccine through Genetic Code Expansion" *Angew. Chem. Int. Ed.* **2014**, *126*, 4967-4971. (*corresponding author; 75% contribution; Impact Factor, 11.261; This article was highlighted in *Nature Chemistry*.)
 16. Niu, W.; **Guo, J.*** "Expanding the Chemistry of Fluorescent Protein Biosensors by Genetic Incorporation of Unnatural Amino Acids" *Mol. Biosyst.* **2013**, *9*, 2961-2970. (*corresponding author; 100% contribution; Impact Factor, 3.183; the second most read article in October, 2013)
 15. Wang, G.; Xu, Z.; Chen, Z.; Niu, W.; Zhou, Y.; **Guo, J.**; Tan, L. "Sequential binding of large molecules to hairy MOFs" *Chem. Commun.* **2013**, *49*, 6641-6643. (as collaborator; 30% contribution; Impact Factor, 6.718)
 14. Ju, T.; Niu, W.; Ronald Cerny; Bollman, J.; Roy, A. **Guo, J.*** "Molecular Recognition of Sulfotyrosine and Phosphotyrosine" *Mol. Biosyst.* **2013**, *9*, 1829 – 1832. (*corresponding author; 100% contribution; Impact Factor, 3.183)
 13. Niu, W.; Schultz, P. G.; **Guo, J.*** "An Expanded Genetic Code In Mammalian Cells With a Functional Quadruplet Codon" *ACS Chem. Biol.* **2013**, *8*, 1640-1645. (*corresponding author; 100% contribution; Impact Factor, 5.331; the second most read article in May, 2013; podcast interview with the journal)
 12. Wang, F.; Niu, W.; **Guo, J.***; Schultz, P. G.* "Unnatural Amino Acid Mutagenesis of Fluorescent Proteins" *Angew. Chem. Int. Ed.* **2012**, *51*, 10132-10135. (*corresponding author; 50% contribution; Impact Factor, 11.261)
 11. Park, C. M.; Niu, W.; Liu, C.; Biggs, T. D.; **Guo, J.**; Xian, M.* "A Proline-Based Phosphine Template for Staudinger Ligation" *Org. Lett.* **2012**, *14*, 4694-4697. (as collaborator; 30% contribution; Impact Factor, 6.364)
- (b) Prior to UNL*
10. Chatterjee, A.; **Guo, J.**; Lee, H. S.; Schultz, P. G. "A Genetically Encoded Fluorescent Probe in Mammalian Cells" *J. Am. Chem. Soc.* **2013**, *135*, 12540–12543.
 9. Wang, F.; Robbins, S.; **Guo, J.**; Shen, W.; Schultz, P. G. "Genetic Incorporation of Unnatural Amino Acid into Proteins in *Mycobacterium tuberculosis*" *PLoS One* **2010**, *5*, e9354.
 8. **Guo, J.**; Melançon III, C. E.; Lee, H. S.; Groff, D.; Schultz, P. G. "Evolution of Amber Suppressor tRNAs for Efficient Bacterial Production of Unnatural Amino Acid-Containing Proteins" *Angew. Chem. Int. Ed. Engl.* **2009**, *48*, 9148-9151.
 7. Lee, H.S.; **Guo, J.**; Lemke, E. A.; Dimla, R. D.; Schultz, P. G. "The Genetic Incorporation of a Small, Environmentally Sensitive, Fluorescent Probe into Proteins in *S. cerevisiae*" *J. Am. Chem. Soc.* **2009**, *131*, 12921-12923.

6. Chen, P.; Groff, D.; **Guo, J.**, Ou, W.; Cellitti, S.; Geierstanger, B. H.; Schultz, P. G. "A Facile System for Encoding Unnatural Amino Acids in Mammalian Cells" *Angew. Chem. Int. Ed. Engl.* **2009**, *48*, 4052-4055. (This article was selected as "Hot Papers" in *Angew. Chem. Int. Ed.*)
5. **Guo, J.**; Wang, J.; Lee, J. S.; Schultz, P. G. "Site-Specific Incorporation of Methyl- and Acetyl-Lysine Analogues into Recombinant Proteins" *Angew. Chem. Int. Ed.* **2008**, *47*, 6399-6401. (This article was highlighted in "Faculty of 1000 Biology".)
4. **Guo, J.**; Wang, J.; Anderson, J. C.; Schultz, P. G. "Addition of an α -Hydroxy Acid to the Genetic Code of Bacteria" *Angew. Chem. Int. Ed.* **2008**, *47*, 722-725. (This article was highlighted in *Nature*.)
3. **Guo, J.**; Frost, J. W. "Synthesis of 5-Amino-5-deoxyshikimate" *Org. Lett.* **2004**, *6*, 1585-1588. (This article was highlighted in *Nat. Prod. Rep.*)
2. **Guo, J.**; Frost, J. W. "Kanosamine Biosynthesis: A Likely Source of the Aminoshikimate Pathway's Nitrogen Atom" *J. Am. Chem. Soc.* **2002**, *124*, 10642-10643.
1. **Guo, J.**; Frost, J. W. "Biosynthesis of 1-Deoxy-1-imino-D-erythrose 4-phosphate: A Defining Metabolite in the Aminoshikimate Pathway" *J. Am. Chem. Soc.* **2002**, *124*, 528-529.

PATENT APPLICATION

5. **Guo, J.**; Li, Q.; Niu, W.; Li, Y.; Wang, N. "Novel Live-Attenuated HIV and Other Vaccines" **2015**, filed.
4. **Guo, J.**; Liu, W.; Schultz, P. G. "Genetic Incorporation of Unnatural Amino Acids into Proteins in Mammalian Cells Using Mutant *E. coli* Leucyl tRNA/tRNA Synthetase Pair" filed.
3. Chen, P. R.; Groff, D.; **Guo, J.**; Geierstanger, B. H.; Schultz, P. G. "A system for introduction of unnatural amino acids into proteins during translation in mammalian cells" PCT Int. Appl. (2010), WO 2010114615.
2. **Guo, J.**; Wang, J.; Anderson, J. C.; Schultz, P. G. "Genetic Incorporation of an alpha-Hydroxy Acid into Proteins to Generate Ester Backbone Linkages at Defined Sites." PCT Int. Appl. (2009), WO 2009064416.
1. Frost, J. W.; **Guo, J.** "Engineered Pathway for Biosynthesis of 3-Aminoshikimic Acid as a Precursor to Oseltamivir Carboxylates" *U.S. Pat. Appl.* (2007) US 2007190621.

MEETINGS & PRESENTATIONS

(a) at UNL

34. "Engineering Synthetic Biopathway and Reprogramming Codon Language" at Qingdao Institute of Bioenergy and Bioprocess Technology, Qingdao, China; June 15, 2015 (invited talk)
33. "Reprogramming Codon Language for Biological Investigations and Applications" at The Johns Hopkins University School of Medicine; May 20, 2015 (invited talk)

32. “Reprogramming Codon Language for Biological Investigations and Applications” at Washington State University; April 27, 2015 (invited talk)
31. “Reprogramming Codon Language for Biological Investigations and Applications” at Michigan State University; April 22, 2015 (invited talk)
30. “Crafting Desired Functions Through Biomolecular Engineering” at Wayne State University; April 17, 2015 (invited talk)
29. “Quadruplet Codon Decoding” at 249th ACS National Meeting, Young Investigators in Biological Chemistry Symposium, March 22, 2015 (oral presentation)
28. “Evolution Of Src Homology 2 Domain” at 249th ACS National Meeting, Young Investigators in Biological Chemistry Symposium, March 22, 2015 (oral presentation)
27. “Reprogramming Codon Language for Biological Investigations and Applications” at University of Utah; March 11, 2015 (invited talk)
26. “Reprogramming Genetic Code for Biochemical and Biomedical Applications” at University of Nebraska Medical Center; February 27, 2015 (invited talk)
25. “Unconventional Codon Usage: Investigations and Applications” at University of California, Riverside; January 29, 2015 (invited talk)
24. “Evolution Of SH2 Domain To Recognize Sulfotyrosine” at Bioorganic Gordon Conference, Andover, NH; June 89-13, 2014 (Poster)
23. “Probing Biological Processes with an Expanded Genetic Code” at Redox Biology Center, University of Nebraska – Lincoln; January 31, 2014 (invited talk)
22. “Genetically Encoded Fluorescent Protein Biosensors” at Bioorganic Gordon Conference, Andover, NH; June 9-14, 2013 (Poster)
21. “Manipulation of Biological Function Through Biomolecular Engineering” at Institute of Biophysics of Chinese Academy of Sciences, Beijing, China; May 14th 2013 (Invited talk).
20. “Manipulation of Biological Function Through Biomolecular Engineering” at Peking University, Beijing, China; May 13th 2013 (Invited talk).
19. “Manipulating Protein Function with an Expanded Genetic Code” at University of Nebraska Medical Center, Omaha, NE; November 29th 2012 (Invited talk)
18. “Applications of Genetic Code Expansion in Biochemical Studies” at ACS Midwest Regional Meeting, Omaha, NE; November 2012 (Invited talk)
17. “Manipulating Protein Function with an Expanded Genetic Code” at Benedictine College, Atchison, KS; October 19th 2012 (Invited talk)
16. “Regio- and Stoichiometric Controlled Assembly of Protein Complexes in Biocatalysis” at Society for Industrial Microbiology and Biotechnology Annual Meeting, Washington D.C.; August 12-16, 2012 (Poster)

15. "Cross-Recognition of Phosphotyrosine and Sulfotyrosine" at Bioorganic Gordon Conference, Andover, NH; June 10-15, 2012 (Poster)
14. "Engineering the Cellulosome and Metabolic Pathways" at Green Chemistry Forum, UNL, October, 3rd, 2011 (invited Oral presentation and panelist)
13. "Molecular Scaffold in Biocatalysis" at ACS Midwest /Great Lakes Regional Meeting, St. Louis; MO; October, 19-22, 2011 (Poster)

(b) Prior to UNL

12. "Genetic Incorporation of Unnatural Amino Acids into Proteins in Mammalian Cells for Biochemical Studies" at NIH Nanomedicine Development Centers 4th Annual Awardee Meeting, Pacific Grove, CA; April 5-8, 2010 (Poster)
11. "An Expanding Genetic Code" at UNL, Lincoln, NE; February 11-12, 2010 (invited research presentation)
10. "Synthesis at the Interface of Chemistry and Biology" at University of Oklahoma, Norman, OK; January 19-20, 2010 (invited research presentation)
9. "Synthesis at the Interface of Chemistry and Biology" at Johns Hopkins University, California, MD; January 11-12, 2010 (invited research presentation)
8. "Synthesis at the Interface of Chemistry and Biology" at Northwestern University, Evanston, IL; January 5-6, 2010 (invited research presentation)
7. "Synthesis at the Interface of Chemistry and Biology" at Emory University, Atlanta, GA; December 16-18, 2009 (invited research presentation)
6. "Synthesis at the Interface of Chemistry and Biology" at Boston College, Chestnut Hill, MA; December 7-8, 2009 (invited research presentation)
5. "Genetic Incorporation Of Unnatural Amino Acids Into Proteins In Mammalian Cells For Biochemical Studies" at Bioorganic Gordon Conference, Andover, NH; June 14-19, 2009 (Poster)
4. "Synthesis at the Interface of Chemistry and Biology" at Colorado State University, Fort Collins, CO; January 22-23, 2009 (invited research presentation)
3. "Synthesis at the Interface of Chemistry and Biology" at University of Washington, Seattle, WA; November 24-25, 2008 (invited research presentation)
2. "From Biosynthetic Studies to Biocatalytic Syntheses - Solving Puzzles and Uncovering Treasures" at The Scripps Research Institute, La Jolla, CA; February 28, 2006 (invited research presentation)
1. "From Biosynthetic Studies to Biocatalytic Syntheses - Solving Puzzles and Uncovering Treasures" at Harvard Medical School, Boston, MA; January 8-9, 2006 (invited research presentation)

PAST, CURRENT, and PENDING SUPPORTPAST

Energy Research Grant (Guo) 01/01/2011 – 12/31/2012
 NCESR (Cycle-5) \$136,499
“Generation Of Biomass-Derived Feedstocks For Biofuel And Bioenergy Production”
 Role: PI (Guo’s share \$136,499)

Nebraska Research Initiative (Guo) 07/01/2013 – 06/30/2015
 University of Nebraska - Lincoln \$100,000
“Novel Live-Attenuated HIV Vaccine”
 Role: PI (Guo’s share \$50,000)

IIA 1338988 (Tan) 09/15/2013 – 08/31/2015
 National Science Foundation \$53,232
“Nebraska-Rouen Collaborations: Hyperbranched Polar Polymers as Solid Lubricants”
 Role: co-PI (Guo’s share \$14,641)

CURRENT

CBET 1264708 (Guo) 07/15/2013 – 06/30/2016
 National Science Foundation \$307,741
“Mechanistic Study of Cellulosome Through Reprogramming Its Assembly”
 Role: PI (Guo’s share \$307,741)

1R01AI111862-01 (Guo/Li) 06/01/2014 – 05/31/2018
 National Institutes of Health \$1,920,988
“Improve the safety of an efficacious live-attenuated HIV-1 vaccine through unnatural amino acid-mediated suppression of blank codon”
 Role: PI (Guo’s share \$996,231)

NSF CBET 1438332 08/01/2014 – 07/31/2017
 National Science Foundation \$317,611
“Novel 1,2-Propanediol Biosynthesis from Renewable Feedstocks Through Enzyme Discovery”
 Role: co-PI (Guo’s share \$50,000)

Energy Research Grant (Guo) 01/01/2015 – 12/31/2015
 NCESR (Cycle-9) \$30,000
“Biosynthesis of Ethylene Glycol from Renewables Resources”
 Role: PI (Guo’s share \$20,000)

Interdisciplinary Research Grant (Guo) 01/01/2015 – 12/31/2015
 UNL Research Council \$20,000
“Identification of Sulfopeptides As HIV-1 Entry Inhibitors Through Phage Display”
 Role: PI (Guo’s share \$10,000)

1R21CA185993-01A1 (Simpson) 05/19/2015 – 04/30/2017
 National Institutes of Health \$182,412
“Defining Aberrant Steroid Elimination in Castration Resistant Prostate Cancer”
 Role: co-I (Guo’s share \$15,602)

Biomedical Research Seed Grant (Stains) 11/24/2014-11/23/2015
 Research Council, UNL \$50,000
 “Quantifying Biochemical Communication in Hepatocellular Carcinoma”
 Role: co-PI (Guo’s share \$7,500)

PENDING

1R21EB022193-01 (DiMagno/Guo/Babich) 04/01/2016 – 03/31/18
 National Institutes of Health \$438,763
 “A minimal perturbation genetic toolkit for albumin-targeting in therapeutic proteins”
 Role: PI (one of the PIs in a multi-PI grant)

MCB 1553041 (Guo) 06/01/2016 – 05/31/2021
 National Science Foundation \$622,320
 “Quadruplet Codon Decoding - Mechanistic Studies and Application in Cellular Genetic Code Expansion”
 Role: PI

TEACHINGA. Courses Taught

Year	Semester	Course	Title	Credit hours	Enrollment
2010	Fall	CHEM263/263A	BS Organic Chemistry lab	2/1	52
2010	Fall	CHEM992E	Seminar in Organic Chemistry	1	14
2011	Spring	<i>approved release from teaching</i>			
2011	Fall	CHEM263/263A	BS Organic Chemistry lab	2/1	50
2011	Fall	CHEM463	Advanced Organic Preparations	1-2	2
2011	Fall	CHEM992E	Seminar in Organic Chemistry	1	11
2012	Spring	CHEM835	Chemical Biology	3	7
2012	Spring	CHEM990	Departmental Colloquium	1	45
2012	Fall	CHEM251	Organic Chemistry I	3	181
2012	Fall	CHEM992E	Seminar in Organic Chemistry	1	11
2012	Fall	CHEM990	Departmental Colloquium	1	43
2012	Fall	CHEM463	Advanced Organic Preparations	1	1
2013	Spring	CHEM835	Chemical Biology	3	15
2013	Fall	CHEM251	Organic Chemistry I	3	188
2013	Fall	CHEM992E	Seminar in Organic Chemistry	1	14

2014	Spring	CHEM835	Chemical Biology	3	16
2014	Fall	CHEM251	Organic Chemistry I	3	175
2015	Spring	CHEM992E	OBC Seminar	1	19
2015	Fall	CHEM251	Organic Chemistry I	3	172

B. Graduate Student Mentored

Graduate Student	Year enrolled	Research Topics
Xi Song	Fall, 10	self-assembly of protein complex for biocatalysis
Tong Ju	Fall, 10	protein tyrosine O-sulfation
Scotty Raber ^{**}	Spring, 11	host targets of virulence factors from <i>M. tuberculosis</i>
Xin Shang	Spring, 12	bioorthogonal reactions
Nanxi Wang	Fall, 12	HIV vaccine and quadruplet codon decoding
Wenjia Zhai	Fall, 12	bioorthogonal reactions
Shaina Ives [*]	Fall, 13	artificial metalloenzyme and biocatalysis
Erome D. Hankore	Fall, 14	Quadruplet decoding and enzyme evolution

Note: * MS students; #, graduated.

Member of Student Thesis Committee who are not in my group (total: 20):

Deepali Rathore, Xiwei (Emmi) Zheng, Andrew Geis, Matthew Beio, Robert Swyka, Stephen Wright, Scott Pettibone, Jia (Emma) Zhao, Jon Beck, Bi Xu, Xinqi Zhou, Sandya Rani Beeram, Katelyenn S. McCauley, Shiden Azaria, Ryan Carr, Benjamin Enns, George Grady, Trieu Nguyen, Travis J. Nelson, and Maia Kelly.

C. Postgraduate-Scholar Sponsored (total: 3)

Kun Liu, University of Nebraska – Lincoln
 Jiliang Hang, now at GC Image
 Qin Zhu, now at University of Pittsburgh

D. Undergraduate advisees (total: 14)

The following undergraduate students have conducted research in my group:

Kyle Humphrey, Joshua Bollman (UCARE), Jaycob Edwards, Nhu Dinh (UCARE), Anthony Roy, Hope Npimnee (UCARE), Daewoo Park, Aaron Lindstrom, Yao (Julia) Liu, Mitchell Groninger, Gloricelly M Roman Arocho (NSF REU); Carly Faller (UCARE), Michael Callahan (UCARE), Ravi Raghani.

SERVICE

University and Departmental Service

1. Chair, Colloquium Committee, 2012
2. Member, Safety and Environment Committee, 2010 - present
3. Member, *Ad hoc* Alumni Relations & Development and 2011 Reunion Committee, 2011
4. Organic division coordinator, 2011 – 2013
5. Biochemistry division coordinator, 2014 - present
5. Chair, *Ad hoc* Graduate Program Committee, 2012 - 2013.
6. Member, *Ad hoc* Graduate Program Committee, 2013 – present
7. Member, Graduate Admissions Committee, 2011 – present
8. Member, *Ad hoc* Web Presence Design Committee, 2012 – 2013
9. Member, Facility Director Search Committee, 2011
10. Member, Lecturer Search Committee, 2013
11. Member, Interdisciplinary Faculty Retreat Planning Committee, 2014

Professional Service

1. Journal Reviewer: *Nature Chemistry*, *Chemical communications*, *Green Chemistry*, *Molecular BioSystems*, *Organic & Biomolecular Chemistry*, *Journal of the American Chemical Society*, *Organic Letters*, *ACS Chemical Biology*, *Bioconjugate Chemistry*, *Journal of Materials Chemistry*, *Analytical & Bioanalytical Chemistry*, *Bioorganic & Medicinal Chemistry*, *Catalysis Science & Technology*, *Energy & Environmental Science*, *Metallomics*, *RCS Advances*, *Scientific Reports*, *Trends in Biochemical Sciences*, and *etc.*
2. Textbook reviewer: Jones/Fleming, *Organic Chemistry*, fifth edition
3. Textbook proposal reviewer: *Biosynthetic Engineering for Drug Discovery* (Taylor & Francis Books); *Plants and Endophytes: an emerging source of biocatalysts* (Royal Society of Chemistry).
4. Editorial Service: Editorial Advisory Board Member for *Organic Chemistry: Current Research*
5. Grant Review:
 - National Science Foundation, Chemical, Bioengineering, Environmental, and Transport Systems (CBET), review panel, 2015
 - National Science Foundation, Chemistry (CHE); *Ad hoc* reviewer, 2013
 - National Science Foundation, Molecular & Cellular Biosciences (MCB), *Ad hoc* reviewer, 2013
 - National Science Foundation, Chemical, Bioengineering, Environmental, and Transport Systems (CBET), review panel, 2013
 - Leukaemia & Lymphoma Research, *Ad hoc* reviewer, 2013