

## BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors.  
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME Jianfeng Cai	POSITION TITLE Professor of Chemistry		
eRA COMMONS USER NAME JIANFENG.CAI			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Nanjing University, Nanjing, China	B.S.	1997	Organic
Nanjing University, Nanjing, China	M.S.	2000	Organic
Washington University in St. Louis, St. Louis, MO	Ph.D.	2006	Bioorganic/Medicinal
Yale University, New Haven, CT		2009	Bioorganic/Medicinal

### A. Personal Statement

My role in this project is the Co-I. I was trained as a bioorganic chemist with extensive interdisciplinary research experience at the interface of chemistry and biology. I received my Ph.D. from Dr. John Stephen Taylor at Washington University in St. Louis, and then worked as a postdoctoral associate in Dr. Andrew D. Hamilton's lab at Yale University. I have published papers in top chemistry journals such as *Sci. Adv.*, *PNAS*, *J. Am. Chem. Soc.*, *Chem. Sci.*, *J. Med. Chem.*, *ChemComm.*, *ACS Chem. Biol.*, *Chem. Eur. J.*, and *Org. Lett.*, etc. At USF I am leading a research group consisting of organic chemists, microbiologists and biochemists, and we are developing chemical tools to probe or modulate biological processes. Our lab is set up for both organic chemistry, biochemistry and cell biology, and we have full access to full biological and nanotechnology facilities on campus. Therefore, I believe I am the perfect person who is the Co-I to contribute to the project.

- a. Fengyu She, Peng Teng, Alfredo Peguero-Tejada, Minghui Wang, Ning Ma, Timothy Odom, Mi Zhou, Erald Gjonaj, Lukasz Wojtas, Arjan van der Vaart, and Jianfeng Cai.\* *De novo Left-Handed Synthetic Peptidomimetic Foldamers*, *Angew. Chem. Int. Ed.*, 2018, 9916-9920.
- b. Peng Teng, Zheng Niu, Fengyu She, Mi Zhou, Peng Sang, Geoffrey M. Gray, Gaurav Verma, Lukasz Wojtas, Arjan van der Vaart, Shengqian Ma,\* and Jianfeng Cai.\* *Hydrogen-Bonding-Driven 3D Supramolecular Assembly of Peptidomimetic Zipper*, *J. Am. Chem. Soc.*, 2018, 140, 5661-5665.
- c. Peng Sang, Min Zhang, Yan Shi, Chunpu Li, Sami Abdulkadir, Qi Li,\* Haitao Ji,\* and Jianfeng Cai.\* *Inhibition of  $\beta$ -Catenin/ B-Cell Lymphoma 9 Protein-Protein Interaction Using  $\alpha$ -Helix-Mimicking Sulfono- $\gamma$ -AApeptide Inhibitors*. *Proc. Natl. Acad. Sci. U. S. A.*, 2019, 116, 10757-10762.
- d. Peng Sang, Zhihong Zhou, Yan Shi, Candy Lee, Zaid Amso, David Huang, Timothy Odom, Vân T.B. Nguyen-Tran, Weijun Shen,\* and Jianfeng Cai.\* *The Activity of Sulfono- $\gamma$ -AApeptide Helical Foldamers That Mimic GLP-1*. *Sci. Adv.* 2020, 6, 20, eaaz4988.

### B. Positions and Honors.

#### Positions and Employment

2007-2009 Postdoctoral Associate, Yale University, New Haven, CT  
 2009-2015 Assistant Professor, University of South Florida, Tampa, FL  
 2015-2018 Associate Professor, University of South Florida, Tampa, FL  
 2018-present Professor, University of South Florida, Tampa, FL  
 2020-present USF Preeminent Professor, University of South Florida, Tampa, FL  
 2009-present Member, Drug Discovery Program, Moffitt Cancer Center, Tampa, FL  
 2019-present Director, Center for Molecular Diversity in Drug Design, Discovery and Development (CMD5), USF

## **Other Experience and Professional Memberships**

2004-present Member, American Chemistry Society, Organic and Medicinal Chemistry Division  
2014-present Member, American Peptide Society  
2015-present Editorial Board member, *ChemistrySelect*  
2017-present Editorial Advisory Board member, *ChemistryOpen*  
2018-present Editorial Board member, *Molecules*  
2020-present Associate Editor, *Acta Pharmaceutica Sinica B*

## **Honors**

2011 Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Universities (ORAU)  
2012 New Investigator award, Florida Bankhead Coley Cancer Research Program  
2014 NSF Career Award  
2014 ChemComm Emerging Investigator  
2015 Biomatik Distinguished Junior Faculty Award, The Chinese-American Chemistry & Chemical Biology Professors Association (CAPA)  
2015 Faculty Outstanding Research Achievement Award, USF  
2018 Faculty Outstanding Research Achievement Award, USF  
2020 Faculty Outstanding Research Achievement Award, USF  
2020 Outstanding Graduate Faculty Mentor Award, USF  
2020 *USF Preeminent Professor*  
2020 Fellow of Royal Society of Chemistry (FRSC)  
2021 Outstanding Faculty Award, USF

## **C. Contributions to Science.**

1. One of our efforts was devoted to the development of a new class of peptidomimetics – AApeptides. Peptidomimetics have been an increasingly important field in the development of drug leads or candidates. It is important to develop new class of peptidomimetics to facilitate drug discovery. We demonstrated that AApeptides can fold into stable helical structures, and therefore we can rationally design helical AApeptides that mimic  $\alpha$ -helix and disrupt  $\alpha$ -helix mediated PPIs. My role is PI in the studies.

- a. Peng Teng, Ning Ma, Darrell Cole Cerrato, Fengyu She, Timothy Odom, Xiang Wang, Li-June Ming, Arjan van der Vaart, Lukasz Wojtas, Hai Xu,\* and Jianfeng Cai.\* Right-Handed Helical Foldamers Consisting of de novo D-AApeptides, *J. Am. Chem. Soc.*, 2017, 7363-7369.
- b. Fengyu She, Peng Teng, Alfredo Peguero-Tejada, Minghui Wang, Ning Ma, Timothy Odom, Mi Zhou, Erald Gjonaj, Lukasz Wojtas, Arjan van der Vaart, and Jianfeng Cai.\* De novo Left-Handed Synthetic Peptidomimetic Foldamers, *Angew. Chem. Int. Ed.*, 2018, 9916-9920.
- c. Peng Sang, Min Zhang, Yan Shi, Chunpu Li, Sami Abdulkadir, Qi Li,\* Haitao Ji,\* and Jianfeng Cai.\* Inhibition of  $\beta$ -Catenin/ B-Cell Lymphoma 9 Protein–Protein Interaction Using  $\alpha$ -Helix-Mimicking Sulfono- $\gamma$ -AApeptide Inhibitors. *Proc. Natl. Acad. Sci. U. S. A.*, 2019, 116, 10757-10762.
- d. Peng Sang, Yan Shi, Junhao Lu, Lihong Chen, Leixiang Yang, Wade Borchers, Sami Abdulkadir, Qi Li,\* Gary Daughdrill,\* Jiandong Chen,\* and Jianfeng Cai.\*  $\alpha$ -Helix-Mimicking Sulfono- $\gamma$ -AApeptide Inhibitors for p53-MDM2/MDMX Protein–Protein Interactions. *J. Med. Chem.* 2020, 2020, 63, 3, 975-986.

2. In addition to rational design, we recently have developed one-bead one-compound (OBOC) and one-bead two-compound (OBTC)  $\gamma$ -AApeptides combinatorial library, from which we can identify potential drug leads or candidates that specifically target protein of interest. My role is PI in these studies.

- a. Haifan Wu, Yaqiong Li, Ge Bai, Youhong Niu, Qiao Qiao, Jeremiah Tipton, Chuanhai Cao,\* Jianfeng Cai.\*  $\gamma$ -AApeptide-based small-molecule ligands that inhibit A $\beta$  aggregation. *Chem. Commun.*, 2014, 50, 5206 – 5208.
- b. Yan Shi, Sridevi Challa, Peng Sang, Fengyu She, Chunpu Li, Geoffrey M. Gray, Alekhya Nimmagadda, Peng Teng, Timothy Odom, Yan Wang, Arjan van der Vaart, Qi Li,\* and Jianfeng Cai.\*

One-Bead-Two-Compound Thioether Bridged Macrocyclic  $\gamma$ -AApeptide Screening Library against EphA2, *J. Med. Chem.*, 2017, 60, 9290-9298.

- c. Yan Shi, Sajjan Parag, Rekha Patel, Ashley Lui, Michel Murr, Jianfeng Cai,\* and Niketa A. Patel.\* Stabilization of lncRNA GAS5 by a small molecule and its implications in diabetic adipocytes. *Cell. Chem. Biol.*, 2019, 26, 319-330.
- d. Hao Yan, Mi Zhou, Umesh Bhattarai, Yabin Song, Mengmeng Zheng, Jianfeng Cai,\* and Fu-Sen Liang.\* Cyclic peptidomimetics as inhibitors for miR-155 biogenesis. *Mol. Pharm.*, 2019, 16, 914-920.

3. One of the major concerns in public health is antibiotic resistance. Host defense peptides can potentially combat drug resistant bacteria, however, their intrinsic instability hamper their further application. Based on the global structure of host defense peptides, we have studied antimicrobial AApeptides which shown broad spectrum activity and limited antibiotic resistance. My role is PI in these studies.

- a. Peng Teng, Da Huo, Alekhya Nimmagadda, Jianfeng Wu, Fengyu She, Ma Su, Xiaoyang Lin, Jiyu Yan, Annie Cao, Chuanwu Xi,\* Yong Hu,\* and Jianfeng Cai.\* Small antimicrobial agents based on acylated reduced amide scaffold. *J. Med. Chem.*, 2016, 59, 7877-7887.
- b. Alekhya Nimmagadda, Xuan Liu, Peng Teng, Ma Su, Yaqiong Li, Qiao Qiao, Nawal K Khadka, Xiaoting Sun, Jianjun Pan, Hai Xu,\* Qi Li,\* and Jianfeng Cai.\* Polycarbonates with Potent and Selective Antimicrobial Activity toward Gram-Positive Bacteria. *Biomacromolecules*, 2017, 18, 87-95.
- c. Ma Su, Donglin Xia, Peng Teng, Alekhya Nimmagadda, Chao Zhang, Timothy Odom, Annie Cao, Yong Hu, and Jianfeng Cai.\* Membrane-Active Hydantoin Derivatives as Antibiotic Agents, *J. Med. Chem.*, 2017, 60, 8456-8465.
- d. Heng Wang, Xiaomin Qian, Kun Wang, Ma Su, Wei-Wei Haoyang, Xin Jiang, Robert Brzozowski, Ming Wang, Xiang Gao, Yiming Li, Bingqian Xu, Prahathes Eswara, Xin-Qi Hao, Weitao Gong,\* Jun-Li Hou,\* Jianfeng Cai,\* Xiaopeng Li.\* Supramolecular Kandinsky Circles with High Antibacterial Activity, *Nat. Commun.*, 2018, 9, 1815.

#### Complete List of Published Work in My Bibliography:

<http://jianfengcai.myweb.usf.edu/publications.html>

#### D. Research Support.

##### Ongoing Research Support

1. PI, NIH 9R01AI152416-06, \$1,868,750, 05/01/2020 – 04/30/2025, Antimicrobial agents derived from AApeptide biomaterials
2. PI, NIH 1R01GM128037-01, \$566,000. 03/01/2020 – 02/28/2022. Self-assembly of 2D metallo-supramolecules as a novel class of antimicrobial biomaterials via forming transmembrane channels.

**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors.  
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NAME: Heng Liu

eRA COMMONS USER NAME (credential, e.g., agency login): Heng Liu

POSITION TITLE: Graduate student

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	Start Date MM/YYYY	Completion Date MM/YYYY	FIELD OF STUDY
Zhengzhou University, China	Bachelor	09/2014	06/2018	Chemistry
University of South Florida	Graduate student	08/2018		Chemistry

**A. Personal Statement**

This is Heng Liu, from Chemistry department, University of South Florida. I obtained my bachelor degree of Chemistry from Chemistry department, Zhengzhou University, China. After finishing my undergraduate education in June, 2018, I joined the graduate program at Chemistry department, University of South Florida. Since then, I have been doing some research about antibacterial agents development based on sulfono-gamma AApeptide. Based on our knowledge and the potential of sulfono-gamma-AApeptide to assemble in certain condition, it is proposed at the first time that the sulfono-gamma-AApeptide would be able to assemble at the membrane surface of bacterial strains to form channel, which would lead to the cell death.

**B. Positions and Honors**

Graduate teaching assistant

**C. Contributions to Science**

Now I'm doing some research about antibacterial agents development, it's highly likely to figure out some lead compound as antibacterial agents.

**D. Additional Information: Research Support and/or Scholastic Performance**

YEAR	COURSE TITLE	GRADE
2019	Chemical biology	89
2018	Adv Org Chem II: Phys-Adv	86.5

YEAR	COURSE TITLE	GRADE
2018	Spect. Anal. of Organic Compds	A+
2019	Introduction to Drug Discovery	81.25