9-2022

Faculty Research Profile: Dr. Shang Jia

Lutishoor Salisbury
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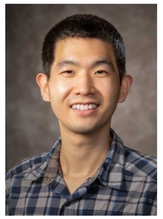
Fardy Faustin
University of Arkansas, Fayetteville

Jeremy Smith
University of Arkansas, Fayetteville

Profile of the Newest CHBC Research Faculty - Welcome Dr. Shang Jia !

Research Assistant Professor

Dr. Shang Jia



Emphasis

- **Fluorophore**
- **Bioimaging**
- **Biosensing**
- **Protein Chemistry**
- **Chemoproteomics**

Professional Experience

- **2022-** Research Assistant Professor, University of Arkansas
- **2019-2022 -** Postdoctoral Fellow, Department of Chemistry & Biochemistry, University of California Los Angeles
  Research Area: near-infrared imaging in animals, molecular fluorophore design and synthesis
- **2014-2019-**Graduate Research Assistant, Department of Chemistry, University of California Berkeley
  Research Area: fluorescent sensors, live cell imaging, protein bioconjugation, proteomics
- **2010-2014-** Undergraduate Researcher, College of Chemistry, Peking University, China.
  Research Area: unnatural amino acid incorporation, biorthogonal and biocompatible chemistry

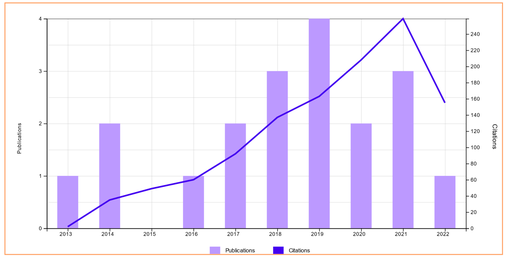
Education

- B.S– Chemistry, Peking University, Beijing, China
- PhD– Chemistry, University of California– Berkeley

Research Interest

The Jia Group performs studies in bioorganic chemistry. One direction is the development of molecular dyes for purposes in imaging, sensing and bioengineering. We get inspired on existing about photochemistry to create sparkles at the interface of different realms. Another topic is new avenues for chemoproteomics study by developing new tools for more efficient proteomics analysis as well as reactive molecules for probing protein function.

Citation Snapshot



Publications	Citing Articles	Times Cited		H-Index
19 Total	957 Analyze Total	1,160 Total	61.05 Average per item	14
From 1945 to 2022	946 Analyze Without self-citations	1,143 Without self-citations		

Top Co-Authors

Authors	Count	% of 19
Chang CJ	12	63.158
Ackerman CM	3	15.789
Chan J	3	15.789
Chen PR	3	15.789
Li J	3	15.789
Lin SX	3	15.789
Cao W	2	10.526
Lee J	2	10.526
Toste FD	2	10.526
Wang J	2	10.526
Yang MY	2	10.526
Zhang XY	2	10.526
Alshmimri SA	1	5.263
Aron AT	1	5.263
Atallah TL	1	5.263
Bao SD	1	5.263
Bulek K	1	5.263

Top Subject Areas

Research Areas	Count	% of 19
Chemistry	9	47.368
Biochemistry Molecular Biology	6	31.579
Science Technology Other Topics	3	15.789
Life Sciences Biomedicine Other Topics	1	5.263
Pharmacology Pharmacy	1	5.263

Top Cited Publications

(1)Li, J.; Yu, J. T.; Zhao, J. Y.; Wang, J.; Zheng, S. Q.; Lin, S. X.; Chen, L.; Yang, M. Y.; **Jia, S.**; Zhang, X. Y.; et al. Palladium-triggered deprotection chemistry for protein activation in living cells. *Nature Chemistry* **2014**, *6* (4), 352-361, Article. DOI: 10.1038/nchem.1887.
Times Cited– 257

(2)Lin, S. X.; Yang, X. Y.; **Jia, S.**; Weeks, A. M.; Hornsby, M.; Lee, P. S.; Nichiporuk, R. V.; Iavarone, A. T.; Wells, J. A.; Toste, F. D.; et al. Redox-based reagents for chemoselective methionine bioconjugation. *Science* **2017**, *355* (6325), 597-602, Article. DOI: 10.1126/science.aal3316.
Times Cited– 221

(3)Li, J.; **Jia, S.**; Chen, P. R. Diels-Alder reaction-triggered bioorthogonal protein decaging in living cells. *Nature Chemical Biology* **2014**, *10* (12), 1003-+, Article. DOI: 10.1038/nchembio.1656.
Times Cited– 165

(4)Li, J.; Lin, S. X.; Wang, J.; **Jia, S.**; Yang, M. Y.; Hao, Z. Y.; Zhang, X. Y.; Chen, P. R. Ligand-Free Palladium-Mediated Site-Specific Protein Labeling Inside Gram-Negative Bacterial Pathogens. *Journal of the American Chemical Society* **2013**, *135* (19), 7330-7338, Article. DOI: 10.1021/ja402424j.
Times Cited– 112

(5)Krishnamoorthy, L.; Cotruvo, J. A.; Chan, J.; Kaluarachchi, H.; Muchenditsi, A.; Pendyala, V. S.; **Jia, S.**; Aron, A. T.; Ackerman, C. M.; Vander Wal, M. N.; et al. Copper regulates cyclic-AMP-dependent lipolysis. *Nature Chemical Biology* **2016**, *12* (8), 586-+, Article. DOI: 10.1038/nchembio.2098.
Times Cited– 87

(6)Xiao, T.; Ackerman, C. M.; Carroll, E. C.; **Jia, S.**; Hoagland, A.; Chan, J.; Thai, B.; Liu, C. S.; Isacoff, E. Y.; Chang, C. J. Copper regulates rest-activity cycles through the locus coeruleus-norepinephrine system. *Nature Chemical Biology* **2018**, *14* (7), 655-+, Article. DOI: 10.1038/s41589-018-0062-z.
Times Cited– 55

(7)**Jia, S.**; He, D.; Chang, C. J. Bioinspired Thiophosphorodichloridate Reagents for Chemoselective Histidine Bioconjugation. *Journal of the American Chemical Society* **2019**, *141* (18), 7294-7301, Article. DOI: 10.1021/jacs.8b11912.
Times Cited– 52

(8)Liao, Y.; Zhao, J. J.; Bulek, K.; Tang, F. Q.; Chen, X.; Cai, G.; **Jia, S.**; Fox, P. L.; Huang, E.; Pizarro, T. T.; et al. Inflammation mobilizes copper metabolism to promote colon tumorigenesis via an IL-17-STEAP4-XIAP axis. *Nature Communications* **2020**, *11* (1), 15, Article. DOI: 10.1038/s41467-020-14698-y.
Times Cited– 36

(9)Guo, L.; **Jia, S.**; Diercks, C. S.; Yang, X. J.; Alshmimri, S. A.; Yaghi, O. M. Amidation, Esterification, and Thioesterification of a Carboxyl-Functionalized Covalent Organic Framework. *Angewandte Chemie-International Edition* **2020**, *59* (5), 2023-2027, Article. DOI: 10.1002/anie.201912579.
Times Cited– 36

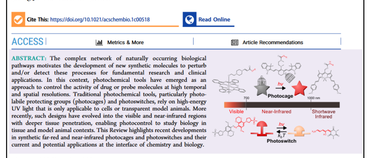
(10) Christian, A. H.; **Jia, S.**; Cao, W.; Zhang, P.; Meza, A. T.; Sigman, M. S.; Chang, C. J.; Toste, F. D. A Physical Organic Approach to Tuning Reagents for Selective and Stable Methionine Bioconjugation.
Times Cited– 26

Three Most Recent Publications

Spatiotemporal Control of Biology: Synthetic Photochemistry Toolbox with Far-Red and Near-Infrared Light

Published as part of the ACS Chemical Biology Young Investigators virtual special issue

Shang Jia and Ellen M. Sletten*



Source: ACS Chem Bio, 2021,

Establishing design principles for emissive organic SWIR chromophores from energy gap laws

Hannah C. Friedman,[1] Emily D. Cosco,[1,2] Timothy L. Atallah,[1,3] Shang Jia,[1] Ellen M. Sletten,[1] and Justin R. Caram[1,4,5,*]

SUMMARY

The rational design of bright near and shortwave infrared (NIR: 700–1,000; SWIR: 1,000–2,000 nm) emitters remains an open question with applications spanning imaging and photonics. Combining experiment and theory, we derive an energy gap quantum yield master equation (EQME), describing the fundamental limits in SWIR quantum yields (Φ_F) for organic chromophores. Evaluating the photophysics of 21 polymethine NIR/SWIR chromophores to parameterize the EQME, we explain the precipitous decline of φ_F past 900 nm through decreasing radiative rates and increasing nonradiative losses via high-frequency vibrations relating to the energy gap. Using the EQME, we develop an energy-gap-independent φ_F NIR/SWIR chromophore comparison metric. We show electron-donating character on polymethine heterocycles results in relative increases in radiative efficiency obscured by a simultaneous redshift. Finally, the EQME yields rational chromophore design insights shown by how deuteration (backed by our experimental results) or molecular aggregation increases SWIR φ_F.

Source: Chem, 2021, vol 7(12), pp. 3359-3376

A microtubule-localizing activity-based sensing fluorescent probe for imaging hydrogen peroxide in living cells

Shang Jia [a], Christopher J. Chang [a,b,*]

[a] Department of Chemistry, University of California, Berkeley, Berkeley, CA 94720, USA
[b] Department of Molecular and Cell Biology, University of California, Berkeley, Berkeley, CA 94720, USA

ARTICLE INFO

Keywords:
Activity-based sensing
Fluorescent probe
Molecular imaging
Reactive oxygen species
Hydrogen peroxide

ABSTRACT

Hydrogen peroxide (H_2O_2) is a major reactive oxygen species (ROS) in living systems with broad roles spanning both oxidative stress and redox signaling. Indeed, owing to its potent redox activity, regulating local sites of H_2O_2 generation and trafficking is critical to determining downstream physiological and/or pathological consequences. We now report the design, synthesis, and biological evaluation of Microtubule Peroxy Yellow 1 (MT-PY1), an activity-based sensing fluorescent probe bearing a microtubule-targeting moiety for detection of H_2O_2 in living cells. MT-PY1 utilizes a boronate trigger to show a selective and robust turn-on response to H_2O_2 in aqueous solution and in living cells. Live-cell microscopy experiments establish that the probe co-localizes with microtubules and retains its localization after responding to changes in levels of H_2O_2, including detection of exogenously added H_2O_2 and endogenously produced H_2O_2 upon stimulation. This work adds to the arsenal of activity-based sensing probes for biological analytes that enable selective molecular imaging with subcellular resolution.

Source: Bioorganic & Medical Chemistry Letters, 2021, vol 48. Article #128252

Publications - By Frequency (from ISI Journal Citation Reports)

Publication Titles	Count	Category Name	Journal Ranking	Quartile in Category
JOURNAL OF THE AMERICAN CHEMICAL SOCIETY	4	Chemistry, Multidisciplinary	16/179	Q1
NATURE CHEMICAL BIOLOGY	3	Biochemistry & Molecular Biology	13/296	Q1
NATURE COMMUNICATIONS	2	Multidisciplinary Sciences	6/73	Q1
ACS CHEMICAL BIOLOGY	1	Biochemistry & Molecular Biology	130/296	Q2
ANGEWANDTE CHEMIE INTERNATIONAL EDITION	1	Chemistry, Multidisciplinary	15/179	Q1
BIOORGANIC MEDICINAL CHEMISTRY LETTERS	1	Chemistry, Organic-Chemistry, Medicinal	42/63 23/56	Q3 Q2
CHEM	1	Chemistry, Multidisciplinary	6/179	Q1
ELIFE	1	Biology	8/94	Q1
INORGANIC CHEMISTRY	1	Chemistry, Inorganic & Nuclear	5/46	Q1
JOURNAL OF BIOLOGICAL CHEMISTRY	1	Biochemistry & Molecular Biology	94/296	Q2
METALLOMICS	1	Biochemistry & Molecular Biology	129/296	Q2
NATURE CHEMISTRY	1	Chemistry, Multidisciplinary	8/179	Q1
SCIENCE	1	Multidisciplinary Sciences	2/73	Q1

Awards

- **2020- Chinese Government Award for Outstanding Self –Financed Students Abroad**
- **2016-2017- The Dauben Memorial Endowment Fund Fellowship**
- **2016- Gerald K. Branch Fellowship**
- **2012-2013- First Class Scholarship of Education Abroad Program**
- **2012– 2013- Kwang-Hua Scholarship**
- **2010-2011- Zhang Wenjin Scholarship**
- **2010-2011- Excellent Students Awards at Peking University**

Patents

- Sletten, E. M., **Jia, S.**, Garcia, C. A., Pengshung, M. H. & van de Wouw, H. L. Water Soluble Heterocycyclyl Polymethine Chromophores. Provisional patent application filed.
- Chang, C. J. & **Jia, S.** Thiophosphorodichloridate Reagents for Chemoselective Histidine Bioconjugation. PCT/US2019/056018

Top Citing Institutions/Organizations

Institution/ Organization-USA	No of Times Cited
UNIVERSITY OF CALIFORNIA SYSTEM	76
UNIVERSITY OF CALIFORNIA BERKELEY	39
HOWARD HUGHES MEDICAL INSTITUTE	26
HARVARD UNIVERSITY	25
UNIVERSITY OF CAMBRIDGE	24
HARVARD MEDICAL SCHOOL	18
SCRIPPS RESEARCH INSTITUTE	17
PENNSYLVANIA COMMONWEALTH SYSTEM OF HIGHER EDUCATION PCSHE	14
UNIVERSITY OF CALIFORNIA LOS ANGELES	14
CORNELL UNIVERSITY	11
JOHNS HOPKINS UNIVERSITY	11
UNIVERSITY OF ILLINOIS SYSTEM	11
STATE UNIVERSITY OF NEW YORK SUNY SYSTEM	10

Institution/ Organization-Other Countries	No of Times Cited
CHINESE ACADEMY OF SCIENCES	70
PEKING UNIVERSITY	62
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS	26
UDICE FRENCH RESEARCH UNIVERSITIES	26
UNIVERSITY OF EDINBURGH	26
UNIVERSITY OF CHINESE ACADEMY OF SCIENCES CAS	20
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CIQUS	13
SICHUAN UNIVERSITY	13
UNIVERSIDADE DE SANTIAGO DE COMPOSTELA	13
UNIVERSITY OF PITTSBURGH	13
CNRS INSTITUTE OF CHEMISTRY INC	12
JAPAN SCIENCE TECHNOLOGY AGENCY JST	12
KYOTO UNIVERSITY	12
PEKING TSINGHUA CTR LIFE SCI	11
TECHNICAL UNIVERSITY OF MUNICH	11

Top Citing Journals and Ranking

Publication Titles	No of Times Cited	Category	Journal Ranking	Quartile in Category
ANGEWANDTE CHEMIE INTERNATIONAL EDITION	64	Chemistry, Multidisciplinary	15/179	Q1
JOURNAL OF THE AMERICAN CHEMICAL SOCIETY	49	Chemistry, Multidisciplinary	16/179	Q1
CHEMICAL SCIENCE	32	Chemistry, Multidisciplinary	25/179	Q1
CHEMICAL COMMUNICATIONS	30	Chemistry, Multidisciplinary	53/179	Q2
CHEMBIOCHEM	28	Chemistry & Molecular Biology-	188/296	Q3
CHEMISTRY A EUROPEAN JOURNAL	24	Chemistry, Multidisciplinary	64/179	Q2
BIOCONJUGATE CHEMISTRY	18	Biochemistry & Molecular Biology -Chemistry, Multidisciplinary- Chemistry, Organic- Biochemical Research Methods	11/79 74/296 52/179 5/56	Q1 Q1 Q2 Q1
CHEMICAL SOCIETY REVIEWS	17	Chemistry, Multidisciplinary	2/179	Q1
NATURE COMMUNICATIONS	15	Multidisciplinary Sciences	6/73	Q1
ACS CHEMICAL BIOLOGY	14	Biochemistry & Molecular Biology -Chemistry, Multidisciplinary- Chemistry, Organic- Biochemical Research Methods	130/296	Q2
CHEMICAL REVIEWS	14	Chemistry, Multidisciplinary	1/179	Q1
MOLECULES	14	Biochemistry & Molecular Biology	117/296	Q2
ORGANIC BIOMOLECULAR CHEMISTRY	14	Chemistry, Organic	13/56	Q1
ACS CENTRAL SCIENCE	13	Chemistry, Multidisciplinary	12/179	Q1

Highly Cited Papers

Redox-based reagents for chemoselective methionine bioconjugation

Shixian Lin,[1,†] Xiaoyu Yang,[1,†,‡] Shang Jia,[1] Amy M. Weeks,[2] Michael Hornsby,[2] Peter S. Lee,[2] Rita V. Nichiporuk,[3] Anthony T. Iavarone,[4] James A. Wells,[2,5] F. Dean Toste,[1,5] | Christopher J. Chang[1,2,5,6,§] |

Cysteine can be specifically functionalized by a myriad of acid-base conjugation strategies for applications ranging from probing protein function to antibody-drug conjugates and proteomics. In contrast, selective ligation to the other sulfur-containing amino acid, methionine, has been precluded by its intrinsically weaker nucleophilicity. Here, we report a strategy for chemoselective methionine bioconjugation through redox reactivity, using oxaziridine-based reagents to achieve highly selective, rapid, and robust methionine labeling under a range of biocompatible reaction conditions. We highlight the broad utility of this conjugation method to enable precise addition of payloads to proteins, synthesis of antibody-drug conjugates, and identification of hypersensitive methionine residues in whole proteomes.

Source: Science, 2017, vol 355(6325), pp.597-602. **Times Cited-221**

Diels-Alder reaction–triggered bioorthogonal protein decaging in living cells

Jie Li[1,3], Shang Jia[1,3] & Peng R Chen[1,2]*

Abstract

Small molecules that specifically activate an intracellular protein of interest are highly desirable. A generally applicable strategy, however, remains elusive. Herein we describe a small molecule–triggered bioorthogonal protein decaging technique that relies on the inverse electron-demand Diels-Alder reaction for eliminating a chemically caged protein side chain within living cells. This method permits the efficient activation of a given protein (for example, an enzyme) in its native cellular context within minutes.

Source: Nature Chemical Biology, 2014, vol 10(12), pp. 1003-+, **Times Cited- 165**

Citing Countries

Countries/Regions	No of Times Cited
USA	319
PEOPLES R CHINA	297
GERMANY	75
ENGLAND	58
JAPAN	56
FRANCE	34
SPAIN	32
INDIA	28
SCOTLAND	28
SWITZERLAND	26
NETHERLANDS	25
PORTUGAL	23
AUSTRALIA	20
ITALY	18
SOUTH KOREA	18
CANADA	16
ISRAEL	13
POLAND	13
RUSSIA	13
SINGAPORE	11
SWEDEN	10
DENMARK	7
AUSTRIA	5

Family

Web of Science®

These citation analyses were performed using Web of Science database. This database is accessible on and off-campus.

Although this database covers a wide range of publications for each faculty member, it does not cover all of their articles. Other databases that cover their publications significantly are: **PubMed and SciFinder.**

University of Arkansas Libraries. Chemistry and Biochemistry Library, September 2022