

Xiaoyu Zhang, Ph.D.

Department of Chemistry, Northwestern University
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PROFESSIONAL APPOINTMENT

Northwestern University	Evanston, IL
Assistant Professor of Chemistry	2022-current
Member of Chemistry of Life Processes Institute (CLP)	2022-current
Member of Robert H. Lurie Comprehensive Cancer Center, Feinberg School of Medicine	2022-current

EDUCATION AND TRAINING

The Scripps Research Institute	La Jolla, CA
Postdoctoral associate	2017 – 2021

Cornell University	Ithaca, NY
Ph.D. in Chemistry and Chemical Biology	2012 – 2017

Zhejiang University	Hangzhou, China
M.S. in Pharmaceutical Science	2008 – 2011
B.S. in Pharmaceutical Science	2004 – 2008

AWARDS AND HONORS

Illumina Pilot Award	2022
NCI-SPORE in Prostate Cancer Career Enhancement Program Award	2022
Ono Pharma Breakthrough Science Initiative Award	2022
Baker Faculty Research Program Award	2022
Damon Runyon-Dale F. Frey Award for Breakthrough Scientists	2021
The NIH Pathway to Independence Award (K99/R00)	2020
Damon Runyon Postdoctoral Fellowship Award	2018 – 2020
Keystone Symposia Future of Science Fund Scholarship	2020
Chinese Government Award for Outstanding Students Abroad	2018
Bayer Teaching Excellence Award of Cornell University	2013
Eli Lilly Asia Outstanding Graduate Thesis Award	2011
Chu Kochen Scholarship of Zhejiang University	2010
Zhejiang Innovation Program and Research Fellowship for Graduate Students	2009 – 2010
First Honor Graduate of Zhejiang Province	2011
First Honor Graduate of Zhejiang University	2011
First-Class Award of Honor for Graduate Students of Zhejiang University	2010
Outstanding Undergraduate Thesis Award of Zhejiang University	2008
First-Class Scholarship for Outstanding Undergraduate Students of Zhejiang University	2006 – 2008

PUBLICATIONS

*equal contribution †co-corresponding authors

1. Miller SP, Maio G, **Zhang X**, Badillo Soto FS, Zhu J, Ramirez SZ and Lin H. A proteomic approach identifies isoform-specific and nucleotide-dependent RAS interactions. *Mol. Cell Proteomics*, 2022.
2. Kramer LT and **Zhang X**. Expanding the landscape of E3 ligases for targeted protein degradation. *Curr. Res. Chem. Biol.*, 2 (2022) 1-5.

3. Hong JY, Malgapo MIP, Liu Y, Yang M, Zhu C, **Zhang X**, Tolbert P, Linder ME and Lin H. High-Throughput Enzyme Assay for Screening Inhibitors of the ZDHHC3/7/20 Acyltransferases. **ACS Chem. Biol.**, 16 (2021) 1318-1324.
4. Garnar-Wortzel L, Bishop TR, Kitamura S, Milosevich N, Asiaban JN, **Zhang X**, Zheng Q, Chen E, Ramos AR, Ackerman CJ, Hampton EN, Chatterjee AK, Young TS, Hull MV, Sharpless KB, Cravatt BF, Wolan DW and Erb MA. Chemical inhibition of ENL/AF9 YEATS domains in acute leukemia. **ACS Cent. Sci.**, 7 (2021) 815-830.
5. **Zhang X**[†], Luukkonen LM, Eissler CL, Crowley VM, Yamashita Y, Schafroth MA, Kikuchi S, Weinstein DS, Symons KT, Nordin BE, Rodriguez JL, Wucherpennig TG, Bauer L, Dix MM, Stamos D, Kinsella TM, Simon GM, Baltgalvis KA and Cravatt BF[†]. DCAF11 supports targeted protein degradation by electrophilic proteolysis-targeting chimeras. **J. Am. Chem. Soc.**, 143 (2021) 5141-5149.

Highlight

“Electrophilic Screening Platforms for Identifying Novel Covalent Ligands for E3 Ligases” *Biochemistry*, 2021.

6. **Zhang X**[†], Thielert M, Li H and Cravatt BF[†]. SPIN4 is a principal endogenous substrate of the E3 ubiquitin ligase DCAF16. **Biochemistry**. 60 (2021) 637-642.

Highlight

“Assembling a Robust Workflow for Characterizing Endogenous E3 Ligase Substrates” *Biochemistry*, 2021.

7. **Zhang X**. Chemical Proteomics for Expanding the Druggability of Human Disease. **ChemBioChem**, 21 (2020) 1-3.
8. Vinogradova EV, **Zhang X**, Remillard D, Lazar DC, Suciú RM, Wang Y, Bianco G, Yamashita Y, Crowley VM, Schafroth MA, Yokoyama M, Konrad DB, Lum KM, Simon GM, Kemper EK, Lazear MR, Yin S, Blewett MM, Dix MM, Nguyen N, Shokhirev MN, Chin EN, Lairson LL, Melillo B, Schreiber SL, Forli S, Tejjaro JR, Cravatt BF. An Activity-Guided Map of Electrophile-Cysteine Interactions in Primary Human Immune Cells. **Cell**, 182 (2020) 1-18.
9. Kosciuk T, Price IR, **Zhang X**, Zhu C, Johnson KN, Zhang S, Halaby SL, Komaniécki GP, Yang M, DeHart CJ, Thomas PM, Kelleher NL, Fromme JC, Lin H. NMT1 and NMT2 are Lysine Myristoyltransferases Regulating the ARF6 GTPase Cycle. **Nat. Commun.**, 11 (2020) 1-17.
10. Yamashita Y, Vinogradova EV, **Zhang X**, Suciú RM, Cravatt BF. A chemical proteomic probe for the mitochondrial pyruvate carrier complex. **Angew. Chem. Int. Ed. Engl.**, 59 (2019) 1-5.
11. Spiegelman NA, **Zhang X**, Jing H, Cao J, Kotliar IB, Aramsangtienchai P, Wang M, Tong Z, Rosch KM, Lin H. SIRT2 and Lysine Fatty Acylation Regulate the Activity of RalB and Cell Migration. **ACS Chem. Biol.**, 14 (2019) 2014-2023.
12. **Zhang X**[†], Crowley VM, Wucherpennig TG, Dix MM, Cravatt BF[†]. Electrophilic PROTACs that degrade nuclear proteins by engaging DCAF16. **Nat. Chem. Biol.**, 15 (2019) 737-746.

Highlight

“Stick it to E3s” *Nat. Chem. Biol.*, 15 (2019) 655-656.

“Greatest hits” *Nat. Chem. Biol.*, 16 (2020) 600-603.

“Chemoproteomic-Driven Discovery of Covalent PROTACs” *Biochemistry*, 59 (2020) 128-129.

“PROTACs that Degrade Nuclear Proteins via a Novel E3 Ligase” *The Bench Blog. Synthego*. 25 Sep 2019
F1000Prime recommendation article. 28 Jun 2019; 10.3410/f.735998607.793561779.

13. Latifkar A, Ling L, Hingorani A, Johansen E, Clement A, **Zhang X**, Hartman J, Fischbach C, Lin H, Cerione RA, Antonyak MA. Loss of Sirtuin 1 Alters the Secretome of Breast Cancer Cells by Impairing Lysosomal Integrity. **Dev. Cell**, 49 (2019) 1-16.
14. Spiegelman NA, Hong JY, Hu J, Jing H, Wang M, Price IR, Cao J, Yang M, **Zhang X**, Lin H. A Small Molecule SIRT2 Inhibitor that Promotes K-Ras4a Lysine Fatty-acylation. **ChemMedChem**, 14 (2019) 744-748.
15. Cao J, Sun L, Aramsangtienchai P, Spiegelman NA, **Zhang X**, Huang W, Seto E, Lin H. HDAC11 regulates type I interferon signaling through defatty-acylation of SHMT2. **Proc. Natl. Acad. Sci.**, 116 (2019) 5487-5492.
16. Hong JY, **Zhang X**, Lin H. HPLC-Based Enzyme Assays for Sirtuins. **Methods Mol. Biol.**, 1813 (2018) 225-234.

17. Spiegelman NA, Price IR, Jing H, Wang M, Yang M, Cao J, Hong JY, **Zhang X**, Aramsangtienchai P, Sadhukhan S, Lin H. Direct Comparison of SIRT2 Inhibitors: Potency, Specificity, Activity-Dependent Inhibition, and On-Target Anticancer Activities. *ChemMedChem*, 13 (2018) 1-6.
18. **Zhang X**, Cao J, Miller SP, Jing H, Lin H. Comparative nucleotide-dependent interactome analysis reveals shared and differential properties of KRas4a and KRas4b. *ACS Cent. Sci.*, 4 (2018) 71-80.
- Highlight
 "Research probes key protein's role in cancer cell growth." Cornell Chronicle, January 24, 2018.
19. Jiang H*, **Zhang X***, Chen X*, Aramsangtienchai P*, Tong Z*, Lin H. Protein lipidation: Occurrence, mechanisms, biological functions, and enabling technologies. *Chem. Rev.*, 118 (2018) 919-988.
20. Jing H*, **Zhang X***, Wisner SA, Chen X, Spiegelman NA, Linder ME, Lin H. SIRT2 and lysine fatty acylation regulate the oncogenic activity of K-Ras4a. *eLife*, 6 (2017) e32436.
- Highlight
 "Research probes key protein's role in cancer cell growth." Cornell Chronicle, January 24, 2018.
 "Research probes key protein's role in cancer cell growth." The Cornell Daily Sun, March 30, 2018.
21. **Zhang X**, Spiegelman NA, Nelson OD, Jing H, Lin H. SIRT6 regulates Ras-related protein R-Ras2 by lysine defatty-acylation. *eLife*, 6 (2017) e25158.
- Highlight
 "SIRT6's ability to suppress cancer cell growth is explained." Cornell Chronicle, May 10, 2017.
22. Jin J, He B, **Zhang X**, Lin H, Wang Y. SIRT2 Reverses 4-Oxononoyl Lysine Modification on Histones. *J. Am. Chem. Soc.*, 138 (2016) 12304-12307.
23. **Zhang X**, Khan S, Jiang H, Antonyak MA, Chen X, Spiegelman NA, Shrimp JH, Cerione RA, Lin H. Identifying the functional contribution of the defatty-acylase activity of SIRT6. *Nat. Chem. Biol.*, 12 (2016) 614-620.
- Highlight
 "Mutant enzyme study aids in understanding of sirtuin's functions." Cornell Chronicle, Jun 27, 2016.
24. Jiang H*, **Zhang X***, Lin H. Lysine fatty acylation promotes lysosomal targeting of TNF- α . *Sci. Rep.*, 6 (2016) 24371.
25. Tong Z, Wang Y, **Zhang X**, Kim DD, Sadhukhan S, Hao Q, Lin H. SIRT7 is activated by DNA and deacetylates histone H3 in the chromatin context. *ACS Chem. Biol.*, 11 (2016) 742-747.
26. He B*, Hu J*, **Zhang X***, Lin H. Thiomyristoyl peptides as cell-permeable Sirt6 inhibitors. *Org. Biomol. Chem.*, 12 (2014) 7498-7502.
27. **Zhang X**, Song Z, Xu J, Ma Z. Improving the NQO1-Inducing Activities of Phenolic Acids from Radix *Salvia miltiorrhiza*: a Methylation Strategy. *Chem. Biol. Drug Des.*, 78 (2011) 558-566.
28. **Zhang X**, Luo L, Ma Z. A deuterium-labelling mass spectrometry-tandem diode-array detector screening method for rapid discovery of naturally occurring electrophiles. *Anal. Bioanal. Chem.*, 400 (2011) 3463-3471.
29. Xu J, Lu J, Sun F, Zhu H, Wang L, **Zhang X**, Ma Z. Terpenoids from *Tripterygium wilfordii*. *Phytochemistry*, 72 (2011) 1482-1487.
30. **Zhang X**, Ma Z. Characterization of bioactive thiophenes from the dichloromethane extract of *Echinops grijisii* as Michael addition acceptors. *Anal. Bioanal. Chem.*, 397 (2010) 1975-1984.
31. **Zhang X**, Zhao X, Ma Z. PYDDT, a novel phase 2 enzymes inducer, activates Keap1-Nrf2 pathway via depleting the cellular level of glutathione. *Toxicol. Lett.*, 199 (2010) 93-101.
32. **Zhang X**, Ma Z. A new fluorescein isothiocyanate-based screening method for the rapid discovery of electrophilic compounds. *Anal. Methods*, 2 (2010) 1472-1478.
33. Shi J*, **Zhang X***, Ma Z, Zhang M, Sun F. Characterization of Aromatase Binding Agents from the Dichloromethane Extract of *Corydalis yanhusuo* Using Ultrafiltration and Liquid Chromatography Tandem Mass Spectrometry. *Molecules*, 15 (2010) 3556-3566.
34. Shi J*, **Zhang X***, Jiang H. 2-(Penta-1, 3-diynyl)-5-(3, 4-dihydroxybut-1-ynyl) thiophene, a Novel NQO1 Inducing Agent from *Echinops grijisii* Hance. *Molecules*, 15 (2010) 5273-5281.

35. Wang L, Sun F, **Zhang X**, Ma Z, Cheng L. A secoiridoid with quinone reductase inducing activity from *Cortex fraxini*. *Fitoterapia*, 81 (2010) 834-837.
36. Cheng L, **Zhang X**, Zhang M, Zhang P, Song Z, Ma Z, Cheng Y, Qu H. Characterization of chemopreventive agents from the dichloromethane extract of *Eurycorymbus cavaleriei* by liquid chromatography–ion trap mass spectrometry. *J. Chromatogr. A*, 1216 (2009) 4859-4867.
37. Ma Z, **Zhang X**. Seven new benzeneacetic acid derivatives and their quinone reductase activity from *Eurycorymbus cavaleriei*. *Phytochem. Lett.*, 2 (2009) 152-158.
38. Ma Z, **Zhang X**, Cheng L, Zhang P. Three lignans and one coumarinolignoid with quinone reductase activity from *Eurycorymbus cavaleriei*. *Fitoterapia*, 80 (2009) 320-326.

PATENTS

1. Cravatt B, Crowley V, **Zhang X**. “Compounds and methods for DCAF-mediated protein degradation” Pub. No. US20200190105A1. *United States Patent and Trademark Office*. 2020.
2. Ma Z, Zhao X, **Zhang X**. “Thiophene compounds as anti-tumor agents” Patent No. 200910099267.X. *State Intellectual Property Office of P.R.C.*, 2009.

RESEARCH SUPPORT

ONGOING

DFS-53-22

03/01/2022 – 02/29/2024

Damon Runyon Cancer Research Foundation

Developing molecular glue degraders as a new drug modality for cancer therapy

ZHANG, XIAOYU (PI)

R00CA248715

02/01/2022 – 01/31/2025

National Cancer Institute (NCI)

Discovery of small molecule-mediated protein degradation pathways in human cancer

ZHANG, XIAOYU (PI)

COMPLETED

K99CA248715

05/01/2020 – 01/07/2022

National Cancer Institute (NCI)

Discovery of small molecule-mediated protein degradation pathways in human cancer

ZHANG, XIAOYU (PI)

DRG-2341-18

07/01/2018 – 04/30/2020

Damon Runyon Cancer Research Foundation

Discovery of chemical probes that support targeted protein degradation in human cancer

ZHANG, XIAOYU (PI)

YK2009015

09/01/2009 – 03/31/2011

Education Department of Zhejiang Province

Characterization of naturally occurring electrophiles that modulate KEAP1-NRF2 pathway

ZHANG, XIAOYU (PI)

TEACHING AND MENTORSHIP

Course Instructor

Spring 2022

Northwestern University, Department of Chemistry

Evanston, IL

- Bioorganic Chemistry/Chemical Biology (CHEM 314/415)

Teaching Assistant

Spring 2013, Spring 2014

Cornell University, Department of Chemistry and Chemical Biology

Ithaca, NY

- Honors Experimental Chemistry (CHEM 3010)

Teaching Assistant

Cornell University, Department of Chemistry and Chemical Biology

- Introduction to Experimental Organic Chemistry (CHEM 2510)

Fall 2012, Fall 2013
Ithaca, NY

Research Mentor

Northwestern University

- Isabella Riha, graduate student (Chemistry)
- Luke Kramer, graduate student (MSTP program)
- Ananya Basu, graduate student (Chemistry)
- Yung Chi Li, undergraduate (Integrated Science Program)
- Fiona Wang, undergraduate (Chemistry)
- Felicia Ko, undergraduate (Chemistry)

2022 – present
Evanston, IL
2022 – present
2022 – present
2022 – present
2022 – present
2022 – present
2022 – present

Research Mentor

The Scripps Research Institute, Department of Chemistry

- Supervised postdoctoral fellow Yongfeng Tao (09/2020 – 01/2022), rotation graduate student Garrett Lindsey (08/2020 – 11/2020), visiting master students Marvin Thielert (12/2018 – 12/2019) and Ludwig Bauer (08/2018 – 11/2018), and high school student intern William Murray (06/2019 – 08/2019)

2017 – 2022
La Jolla, CA

Research Mentor

Cornell University, Department of Chemistry and Chemical Biology

- Supervised graduate students Steve Halaby (03/2014 – 06/2014), Arash Latifkar (03/2015 – 10/2017), Tatsiana Kosciuk (03/2016 – 10/2017) and Seth Miller (10/2016 – 10/2017), master student Patricia Tolbert (01/2017 – 10/2017), and undergraduate student David Kim (11/2015 – 05/2016)

2013 – 2017
Ithaca, NY

PROFESSIONAL EXPERIENCE

Member, American Association for Cancer Research

Member, American Society for Mass Spectrometry

Guest Editorial Board, PLOS ONE

Manuscript reviewer for

- Cell
- Nature Chemical Biology
- Journal of the American Chemical Society
- Journal of Medicinal Chemistry
- Cell Chemical Biology
- Bioorganic & Medicinal Chemistry (2017 Award for Outstanding Contribution in Reviewing)
- ChemBioChem
- PLOS ONE
- Analytical and Bioanalytical Chemistry
- ACS Omega
- Molecules
- Pharmaceuticals
- Plants
- Antibiotics

2022 – present
2021 – present
2019 – present
2016 – present

Associate Faculty Member, Faculty of 1000

Editorial Board, Current Metabolomics and Systems Biology

2013 – 2016
2020 – 2021

PRESENTATIONS

1. Discovery of small molecule-mediated protein degradation pathways. *Dana Farber Targeted Protein Degradation Webinar. July 2021, webinar. [invited speaker]*
2. Electrophilic PROTACs that degrade nuclear proteins by engaging DCAF16. *Translational Chemical Biology Conference. October 2020, virtual conference. [invited speaker]*
3. Electrophilic PROTACs that degrade nuclear proteins by engaging DCAF16. *Keystone Symposia on Proteomics in Cell Biology and Disease. September 2020, virtual conference. [invited speaker]*

4. Electrophilic PROTACs that degrade nuclear proteins by engaging DCAF16. *Broad Institute Next Generation in Biomedicine Symposium, September 2019, Cambridge, MA, US. [invited speaker]*
5. Discovery of small molecule-mediated protein degradation pathways. *San Diego Researchers Association Seminar, September 2019, San Diego, CA, US. [invited speaker]*
6. SIRT6 regulates protein secretion and exosome biogenesis by lysine defatty-acylation. *Membrane Signaling Group Seminar, Cornell University, April 2016, Ithaca NY, US. [invited speaker]*
7. The defatty-acylase activity of SIRT6 in tumor suppression. *Keck Biomembrane Retreat, Cornell University and Weill Cornell Medical College, June 2015, Ithaca NY, US. [invited speaker]*
8. A simple on-line screening method for rapid discovery of Michael addition acceptors from natural products. *Westlake International Medical Conference-Translational Medicine, June 2010, Hangzhou, China. [invited speaker]*
9. PYDDT, a novel Nrf2 activator. *The 6th Chinese Conference on Oncology & 9th Cross-Strait Academic Conference on Oncology, May 2010, Shanghai, China. [invited speaker]*
10. Zhang X, Crowley VM, Wucherpfennig TG, Dix MM, Cravatt BF. Electrophilic PROTACs that degrade nuclear proteins by engaging DCAF16. *Keystone Symposia on Proteomics in Cell Biology and Disease, September 2020, virtual conference. [poster]*
11. Zhang X, Crowley VM, Wucherpfennig TG, Dix MM, Cravatt BF. Degradation of nuclear proteins by electrophilic probes via engaging a Cullin-RING E3 ubiquitin ligase. *Damon Runyon Cancer Research Foundation Annual Fellows' Retreat, September 2018, Beverly MA, US. [poster]*
12. Zhang X, Khan S, Jiang H, Antonyak MA, Chen X, Spiegelman NA, Shrimp JH, Cerione RA, Lin H. Identifying the functional contribution of the defatty-acylase activity of SIRT6. *Emerging Paradigms in Drug Discovery & Chemical Biology, The New York Academy of Sciences, October 2016, New York City NY, US. [poster]*
13. Zhang X, Khan S, Jiang H, Antonyak MA, Chen X, Spiegelman NA, Shrimp JH, Cerione RA, Lin H. Identifying the functional contribution of the defatty-acylase activity of SIRT6. *Gordon Research Conference-Bioorganic Chemistry, June 2016, Andover NH, US. [poster]*
14. Zhang X, Antonyak MA, Cerione RA, Lin H. Functional dissection of SIRT6 enzymatic activities. *Cornell Chemistry Biology Interface Symposium, Cornell University, April 2016, Ithaca NY, US. [poster]*
15. Zhang X, Lin H. Investigating the function of protein lysine fatty-acylation. *Cornell Chemistry Biology Interface Symposium, May 2015, Ithaca NY, US. [poster]*
16. Zhang X, Ma Z. Discovery and functional study of novel naturally occurring electrophiles. *Lilly China Innovation Symposium and Award Ceremony, June 2011, Shanghai, China. [poster]*
17. Zhang X, Ma Z. Depleting cellular glutathione and subsequently S-glutathionylation of Keap1 by electrophilic agents activates Keap1-Nrf2 pathway. *AACR 101st Annual Meeting, April 2010, Washington DC, US. [poster]*