

## **YONG (TIGER) ZHANG**

University of Southern California  
1985 Zonal Avenue  
Los Angeles, CA 90089  
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### **Education:**

- 08/2006 – 06/2011 **Ph.D. in Biochemistry**, Department of Biochemistry  
Albert Einstein College of Medicine, Bronx, New York, USA  
Advisor: Professor Vern L. Schramm  
Transition State Analysis, Enzyme Catalytic Mechanism,  
Development of Transition State Analogue Inhibitors for Human  
and *Plasmodium falciparum* Orotate Phosphoribosyltransferases
- 05/2004 – 05/2006 **M.Sc. in Biophysics**, Department of Molecular and Cellular Biology  
University of Guelph, Guelph, Ontario, Canada  
Advisor: Professor A. Rod Merrill  
Characterization of Diphthamide Modification and ADP-ribosylation  
of Eukaryotic Elongation Factor-2 by *Pseudomonas aeruginosa* Exotoxin A
- 09/1999 – 06/2003 **B.Sc. in Biological Sciences**, School of Life Sciences  
Shandong University, Jinan, Shandong, China  
Advisor: Professor Jinxing Wang  
Cloning of Toll-like Receptor 6 Gene and Extraction of Genomic DNA  
from *Penaeus chinensis*

### **Postdoctoral Experience:**

- 07/2011 – 11/2014 Department of Chemistry, The Scripps Research Institute (07/2011-04/2012)  
California Institute for Biomedical Research (05/2012-11/2014)  
La Jolla, California, USA  
Advisor: Professor Peter G. Schultz  
Structural, Functional, and Engineering Studies of Antibodies with Novel  
CDR3H Architecture; Development of HIV Vaccine, Therapeutic Bi-Specific  
Antibodies, Antibody-Drug Conjugates Using Genetically Encoded  
Unnatural Amino Acids

### **Appointment:**

- 12/2014 – Present Assistant Professor of Pharmacology and Pharmaceutical Sciences  
School of Pharmacy, University of Southern California  
Los Angeles, California, USA
- 12/2014 – Present Full Member of Translational and Clinical Sciences Program  
USC Norris Comprehensive Cancer Center
- 01/2016 – Present Member of USC Research Center for Liver Diseases
- 06/2016 – Present Assistant Professor of Chemistry, Dornsife College of Letters, Arts and Sciences  
University of Southern California, Los Angeles, California, USA
- 04/2017 – Present Director of the Pharmaceutical Sciences Program  
School of Pharmacy, University of Southern California

### **Awards and Honors:**

- 07/2020 NIGMS Maximizing Investigators' Research Award (MIRA)
- 06/2019 TRDRP New Investigator Award
- 06/2019 CBCRP Innovative Development and Exploratory Award
- 04/2019 AACR-Bayer Innovation and Discovery Grant
- 03/2019 Department of Defense CDMRP Career Development Award

01/2019	The V Scholar PLUS Award, the V Foundation for Cancer Research
04/2018	PhRMA Foundation Research Starter Grant in Translational Medicine and Therapeutics
11/2017	STOP CANCER Research Career Development Award
08/2017	New Investigator Grant, American Association of Pharmaceutical Scientists Foundation
09/2016	The V Scholar Award, the V Foundation for Cancer Research
03/2012	Julius Marmur Research Award for Outstanding Achievement in Graduate Research
12/2010	Sponsored Membership in AAAS/Science for Excellence in Science
05/2004	University of Guelph Entrance Scholarship
09/2000 – 06/2001	The Honor of “Excellent Student of Shandong University”
03/2001 – 06/2001	Shandong University Scholarship
09/2000 – 01/2001	Shandong University Scholarship
03/2000 – 06/2000	Shandong University Scholarship
09/1999 – 01/2000	Shandong University Scholarship

### **Teaching:**

11/2014 – Present	Biological Systems I (PHRD503) Biological Systems II (PHRD504) Drug Design and Discovery (PSCI664) Principal Research Approaches and Scientific Writing (PSCI 556) Molecular Pharmacology and Toxicology (MPTX501) Pharmacology (MPTX502) Introduction to Tools and Techniques for Chemical Biology (PSCI557) Immunopharmaceutics (PSCI655) Protein Chemistry – Structure and Function (BIOC549) Protein Engineering and Drug Discovery (PSCI599) Immunology and Immunotherapeutics (RXRS408) Undergraduate Research Seminar (CHEM294), Directed Research (CHEM490)
09/2004 – 05/2006	Graduate Teaching Assistant for Immunology (MICR*3230), Introductory Biochemistry Laboratory (BIOC*2580), Introductory Cell Biology (MCB*2210) Department of Molecular and Cellular Biology, University of Guelph, Guelph, Ontario, Canada
02/2001 – 06/2001	Undergraduate Teaching Assistant for Plant Biology, School of Life Sciences, Shandong University, Jinan, Shandong, China

### **Professional Memberships:**

2009 – Present	American Chemical Society
2015 – Present	American Association of Pharmaceutical Scientists
2018 – Present	American Association for Cancer Research

### **Peer Review for Professional Journals:**

ACS Catalysis	ACS Nano	Anal. Biochem.
Anal. Chem.	BBA - Proteins and Proteomics	Bioorg. Med. Chem.
Cell. Mol. Life Sci.	Chem. Commun.	FEBS J.
J. Am. Chem. Soc.	J. Mol. Catal. B Enzym.	J. Org. Chem.
Mol. Pharm.	Org. Biomol. Chem.	Phys. Chem. Chem. Phys.
PLOS ONE	Protein Expr. Purif.	Protein Sci.
RSC Adv.	Theranostics	

### **Peer Review for Funding Agencies:**

Wright Foundation
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Keck School of Medicine of University of Southern California  
 Norris Comprehensive Cancer Center of University of Southern California  
 The Center for the Advancement of Science in Space (CASIS)  
 Southern California Clinical and Translational Science Institute (SC CTSI)  
 National Institutes of Health (NIH)

### **Committee Memberships:**

07/2020 – Present	Faculty Advisory Committee for USC Stevens Center for Innovation
05/2020	PhD Dissertation committee for Santosh Peddi (Advisor: Dr. Andrew Mackay)
03/2020	Ad hoc Strategic Planning Sub-Committee on PhD Education
03/2020	MSc Dissertation committee for Xuejun He, (Advisor: Dr. Jean Shih)
03/2020	MSc Dissertation committee for Yanni Ma, (Advisor: Dr. Sarah Hamm-Alvarez)
03/2020	MSc Dissertation committee for Jingyi Wang, (Advisor: Dr. Clay Wang)
01/2020	PhD qualifying examination committee for Patrick Lehman (Advisor: Dr. Clay Wang)
11/2019	PhD qualifying examination committee for Christian Rabot (Advisor: Dr. Clay Wang)
11/2019	PhD qualifying examination committee for Dokyun Kim (Advisor: Dr. Jae Jung)
06/2019	PhD Dissertation committee for Michelle Grau, (Advisor: Dr. Clay Wang)
03/2019	MSc Dissertation committee for Peirou Chu, (Advisor: Dr. Jean Shih)
03/2019	MSc Dissertation committee for Jinghua Cai, (Advisor: Dr. Jean Shih)
03/2019	MSc Dissertation committee for Jiachun Li, (Advisor: Dr. Jean Shih)
03/2019	MSc Dissertation committee for Zhiyuan Yao, (Advisor: Dr. Andrew Mackay)
03/2019	MSc Dissertation committee for Yue Wang, (Advisor: Dr. Andrew Mackay)
03/2019	PhD Dissertation committee for Hsuan-Yao (Sean) Wang, (Advisor: Dr. Wei-Chiang Shen)
12/2018	Ad hoc selection committee on AFPE Fellowship Award Applications
10/2018	PhD qualifying examination committee for Connor Hurd (Advisor: Dr. Ansgar Siemer)
09/2018	PhD qualifying examination committee for Long Zheng (Advisor: Dr. Alan Epstein)
08/2018	PhD Dissertation committee for Caitlin DeAngelo, (Advisor: Dr. Nicos Petasis)
06/2018	MSc Dissertation committee for Benjamin Cooperman (Advisor: Dr. Sarah Hamm-Alvarez)
03/2018	PhD Dissertation committee for Tzu-Shyang Lin, (Advisor: Dr. Clay Wang)
01/2018	PhD qualifying examination committee for Christina (Runzhong) Fu (Advisor: Dr. Sarah Hamm-Alvarez)
12/2017	Ad hoc selection committee on AFPE Fellowship Award Applications
12/2017	PhD Dissertation committee for Li Zhou, (Advisor: Dr. Wei-Chiang Shen)
12/2017	PhD qualifying examination committee for Santosh Peddi (Advisor: Dr. Andrew Mackay)
12/2017	PhD qualifying examination committee for Michelle Grau, (Advisor: Dr. Clay Wang)
11/2017	PhD qualifying examination committee for Xianhui Chen, (Advisor: Dr. Pin Wang)
08/2017 – 12/2017	Individual Development Plan (IDP) committee for Li Zhou (Advisor: Dr. Wei-Chiang Shen)
08/2017 – Present	Graduate Program Curriculum Committee, USC School of Pharmacy
08/2017 – Present	Graduate Affairs Chair Committee, USC School of Pharmacy
05/2017 – Present	Faculty Search Committee, Department of Pharmacology and Pharmaceutical Sciences USC School of Pharmacy
04/2017 – Present	Graduate Affairs Committee, Department of Pharmacology and Pharmaceutical Sciences, USC School of Pharmacy
02/2017	Strategic Planning Steering Committee, USC School of Pharmacy
01/2017	PhD qualifying examination committee for Changrim Lee

	(Advisor: Dr. Andrew Mackay)
11/2016	PhD qualifying examination committee for Jingyu Chen, (Advisor: Dr. Bangyan Stiles)
11/2016 – Present	Faculty delegate of the Globalization of Pharmaceuticals Education Network (GPEN)
10/2016 – Present	Admissions Committee for Graduate Programs in Biomedical and Biological Sciences (PIBBS), USC Keck School of Medicine
10/2016 – Present	Admissions Committee for Pharmaceutical & Translational Sciences (PHTS) Graduate Program, USC School of Pharmacy
10/2016 – 05/2018	Scholarship Oversight Committee for Dr. Erica Escobedo Hematology-Oncology Fellow of Children's Hospital Los Angeles (CHLA) (Advisor: Dr. Shahab Asgharzadeh)
09/2016 – 08/2017	Laboratory Safety Advisory Committee, USC School of Pharmacy
09/2016	PhD qualifying examination committee for Brandon Wolfe (Advisor: Dr. Alan Epstein)
03/2016	MSc thesis examination committee for Tianhan Dong, (Advisor: Dr. Jean Shih)
11/2015	PhD qualifying examination committee for Hsuan-Yao (Sean) Wang (Advisor: Dr. Wei-Chiang Shen)
08/2015	Ad hoc selection committee on Krown Fellowship Award

### **Reviews:**

1. Shi, X., Cheng, Q. and **Zhang, Y.** Reprogramming Extracellular Vesicles with Engineered Proteins. *Methods*, 2020, 177, 95-102.
2. Cassera, M.B., **Zhang, Y. (co-first author)**, Hazleton, K.Z. and Schramm, V.L. Purine and Pyrimidine Pathways as Targets in *Plasmodium falciparum*. *Curr. Top. Med. Chem.*, 2011, 11, 2103-2115.

### **Original Research Publications:**

1. Shi, X., Zhang, X.N., Chen, J., Cheng, Q., Pei, H., Louie, S.G. and **Zhang, Y.** A Poly-ADP-Ribose Polymer-Based Antibody-Drug Conjugate. *Chem. Sci.* 2020, 11, 9303-9308.
2. Shi, X. and **Zhang, Y.** A Humanized Antibody Inhibitor for Cathepsin L. *Protein Sci.* 2020, 29, 1924-1930.
3. Dai, Z., Zhang, X.N., Nasertorabi, F., Cheng, Q., Li, J., Katz, B.B., Smbatyan, G., Pei, H., Louie, S. G., Lenz, H.J., Stevens, R.C. and **Zhang, Y.** Synthesis of Site-Specific Antibody-Drug Conjugates by ADP-Ribosyl Cyclases. *Sci. Adv.* 2020, 6, eaba6752.
4. Madern, J.M., Kim, R.Q., Misra, M., Dikic, I., **Zhang, Y.**, Ovaa, H., Codee, J.D.C., Filippov, D.V. and van der Heden van Noort, G.J. Synthesis of Stable NAD<sup>+</sup> Mimics as Inhibitors for the Legionella Pneumophila Phosphoribosyl Ubiquitinating Enzyme SdeC. *ChemBioChem* 2020, In Press
5. Park, M., Vaikari, V.P., Lam, A.T., **Zhang, Y.**, Mackay, J.A. and Alachkar, H. Anti-FLT3 nanoparticles for acute myeloid leukemia: preclinical pharmacology and pharmacokinetics. *J. Control. Release* 2020, 324, 317-329.
6. Dai, Z., Cheng, Q. and **Zhang, Y.** Rational Design of a Humanized Antibody Inhibitor of Cathepsin B. *Biochemistry* 2020, 59, 1420-1427.
7. Cheng, Q., Shi, X. and **Zhang, Y.** Reprogramming Exosomes for Immunotherapy. *Methods Mol. Biol.* 2020, 2097, 197-209.
8. Shi, X., Cheng, Q., Hou, T., Han, M., Smbatyan, G., Lang, J.E., Epstein, A.L., Lenz, H.J. and **Zhang, Y.** Genetically Engineered Cell-Derived Nanoparticles for Targeted Breast Cancer Immunotherapy. *Mol. Ther.* 2020, 28, 536-547.
9. Zhang, X.N., Cheng, Q., Chen, J., Lam, A.T., Lu, Y., Dai, Z., Pei, H., Evdokimov, N.M., Louie, S.G. and **Zhang, Y.** A Ribose-Functionalized NAD<sup>+</sup> with Unexpected High Activity and Selectivity for Protein Poly-ADP-Ribosylation. *Nat. Commun.* 2019, 10, 4196.
10. Zhang, X.N., Dai, Z., Cheng, Q. and **Zhang, Y.** Chemoenzymatic Preparation of 4'-Thioribose NAD. *Curr. Protoc. Nucleic Acid Chem.* 2019, 77, e83.

11. Cheng, Q., Shi, X., Han, M., Smbatyan, G., Lenz, H.J. and **Zhang, Y.** Reprogramming Exosomes as Nanoscale Controllers of Cellular Immunity. *J. Am. Chem. Soc.* 2018, 140, 16413–16417
12. Dai, Z., Zhang, X.N., Nasertorabi, F., Cheng, Q., Pei, H., Louie, S.G., Stevens, R.C. and **Zhang, Y.** Facile Chemoenzymatic Synthesis of a Novel Stable Mimic of NAD<sup>+</sup>. *Chem. Sci.* 2018, 9, 8337-8342  
Featured in Front Cover
13. Chen, J., Lam, A.T. and **Zhang, Y.** A Macrodomein-Linked Immunosorbent Assay (MLISA) for Mono-ADP-Ribosyltransferases. *Anal Biochem.*, 2017, 543, 132-139
14. Du, J., Cao Y., Liu, Y., Wang, Y., **Zhang, Y.**, Fu, G., Zhang, Y., Lu, L., Luo, X., Kim, C.H., Schultz, P.G. and Wang, F. Engineering Bifunctional Antibodies with Constant Region Fusion Architectures. *J. Am. Chem. Soc.*, 2017, 139, 18607–18615
15. Liu, Y., Wang, Y., **Zhang, Y.**, Liu, T., Jia, H., Zou, H., Fu, Q., Zhang, Y., Lu, L., Chao, E., Parker, H., Nguyen-Tran, V.T.B., Shen, W., Wang, D., Schultz, P.G. and Wang, F. Rational Design of Dual Agonist-Antibody Fusions as Long-Acting Therapeutic Hormones. *ACS Chem. Biol.*, 2016, 11, 2991-2995.
16. Luo, X., Wang, T.S.A., **Zhang, Y.**, Wang, F. and Schultz, P.G. Stabilizing Protein Motifs with a Genetically Encoded Metal-Ion Chelator. *Cell Chem. Biol.*, 2016, 23,1098-102.
17. Wang, R.E., Wang, Y., Zhang, Y., Gabrelow, C., **Zhang, Y.**, Chi, V., Fu, Q., Luo, X., Wang, D., Joseph, S., Johnson, K., Chatterjee, A.K., Wright, T.M., Nguyen-Tran, V.T.B., Teijaro, J., Theofilopoulos, A.N., Schultz, P.G. and Wang, F. Rational Design of a Kv1.3 Channel-Blocking Antibody as a Selective Immunosuppressant. *Proc. Natl. Acad. Sci. U.S.A.*, 2016, 113, 11501-11506.
18. **Zhang, Y.**, Zou, H., Wang, Y., Caballero, D., Gonzalez, J., Chao, E., Welzel, G., Shen, W., Wang, D., Schultz, P.G. and Wang, F. Rational Design of a Humanized Glucagon-Like Peptide-1 Receptor Agonist Antibody. *Angew. Chem. Int. Ed. Engl.*, 2015, 54, 2126-2130.
19. Liu, T., **Zhang, Y. (co-first author)**, Liu, Y., Wang, Y., Jia, H., Kang, M., Luo, X., Caballero, D., Gonzalez, J., Wang, D., Woods, A., Schultz, P.G. and Wang, F. Functional Human Antibody CDR Fusions as Long-Acting Therapeutic Endocrine Agonists. *Proc. Natl. Acad. Sci. U.S.A.*, 2015, 112, 1356-1361.
20. **Zhang, Y. (co-first author)**, Liu, Y., Wang, Y., Schultz, P.G. and Wang, F. Rational Design of Humanized Dual-Agonist Antibodies. *J. Am. Chem. Soc.*, 2015, 137, 38-41.
21. Lu, H., Zhou, Q., Deshmukh, V., Phull, H., Ma, J., Tardif, V., Naik, R.R., Bouvard, C., **Zhang, Y.**, Choi, S., Lawson, B.R., Zhu, S., Kim, C.H. and Schultz, P.G. Targeting Human C-Type Lectin-like Molecule-1 (CLL1) with a Bispecific Antibody for Immunotherapy of Acute Myeloid Leukemia. *Angew. Chem. Int. Ed. Engl.*, 2014, 53, 9841–9845.
22. **Zhang, Y.**, Goswami, D., Wang, D., Wang, T.S.A., Sen, S., Magliery, T.J., Griffin, P.R., Wang, F. and Schultz, P.G. An Antibody with a Variable Region Coiled-Coil “Knob” Domain. *Angew. Chem. Int. Ed. Engl.*, 2014, 53, 132-135.
23. **Zhang, Y.**, Evans, G.B., Clinch, K., Crump, D.R., Harris, L.D., Fröhlich, R.F.G., Tyler, P.C., Hazleton, K.Z., Cassera, M.B. and Schramm, V.L. Transition State Analogues of *Plasmodium falciparum* and Human Orotate Phosphoribosyltransferases. *J. Biol. Chem.*, 2013, 288, 34746-54.
24. **Zhang, Y.**, Wang, D., Welzel, G., Wang, Y., Schultz, P.G. and Wang, F. An Antibody CDR3-Erythropoietin Fusion Protein. *ACS Chem. Biol.*, 2013, 8, 2117-2121
25. **Zhang, Y.**, Wang, D., de Lichtenvelde, L., Sun, S.B., Smider, V.V., Schultz, P.G. and Wang, F. Functional Antibody CDR3 Fusion Proteins with Enhanced Pharmacological Properties. *Angew. Chem. Int. Ed. Engl.*, 2013, 52, 8295-8298.
26. Wang, F., Sambandan, D., Wang, J., Halder, R., Batt, S., Weinrick, B.C., Ahmad, I., Yang, P, **Zhang, Y.**, Kim, J., Hassani, M., Huszar, S., Mikusova, K., Chatterjee, A., Besra, G., Futterer, K., Jacobs, W.R. Jr. and Schultz, P.G. Identification of a Small Molecule with Activity against Drug-resistant and Persistent Tuberculosis. *Proc. Natl. Acad. Sci. U.S.A.*, 2013, 110, E2510-7.

27. Wang, F., Ekiert, D.C., Ahmad, I., Li, W., **Zhang, Y.**, Bazirgan, O., Torkamani, A., Raudsepp, T., Mwangi, W., Criscitiello, M.F., Wilson, I.A., Schultz, P.G. and Smider, V.V. Reshaping Antibody Diversity. *Cell*, 2013, 153, 1379-93.
28. **Zhang, Y.** and Schramm, V.L. Ground-State Destabilization in Orotate Phosphoribosyltransferases by Binding Isotope Effects. *Biochemistry*, 2011, 50, 4813-4818.
29. Vetting, M.W., Hegde, S.S., **Zhang, Y.** and Blanchard, J.S. Pentapeptide Repeat Proteins that Act as Topoisomerase Poison Resistance Factors Have a Common Dimer Interface. *Acta Crystallogr. Sect. F Struct. Biol. Cryst. Commun.*, 2011, 67, 296-302.
30. **Zhang, Y.**, Deng, H. and Schramm, V.L. Leaving Group Activation and Pyrophosphate Ionic State at the Catalytic Site of *Plasmodium falciparum* Orotate Phosphoribosyltransferase. *J. Am. Chem. Soc.*, 2010, 132, 17023-17031.
31. **Zhang, Y.** and Schramm, V.L. Pyrophosphate Interactions at the Transition States of *Plasmodium falciparum* and Human Orotate Phosphoribosyltransferases. *J. Am. Chem. Soc.*, 2010, 132, 8787-8794.
32. Abdo, M., **Zhang, Y.**, Schramm, V.L. and Knapp, S. Electrophilic Aromatic Selenylation: New OPRT Inhibitors. *Org. Lett.*, 2010, 12, 2982-2985.
33. **Zhang, Y.**, Luo, M. and Schramm, V.L. Transition States of *Plasmodium falciparum* and Human Orotate Phosphoribosyltransferases. *J. Am. Chem. Soc.*, 2009, 131, 4685-4694.
34. **Zhang, Y. (co-first author)**, Liu, S., Lajoie G. and Merrill, A.R. The Role of the Diphthamide-containing Loop within Eukaryotic Elongation Factor 2 in ADP-Ribosylation by *Pseudomonas aeruginosa* Exotoxin A. *Biochem. J.*, 2008, 413, 163-174.

### **Structure Publications:**

1. **Zhang, Y.**, Zhan, C., Patskovsky, Y., Ramagopal, U., Shi, W., Toro, R., Wengerter, B.C., Milstein, S., Vidal, M., Burley, S.K., Almo, S.C. Structure of *Caenorhabditis elegans* UDP-Glucose Dehydrogenase. 2006, **PDB ID: 2O3J**.
2. Dai, Z., Zhang, X.N., Nasertorabi, F., Cheng, Q., Pei, H., Louie, S.G., Stevens, C.R., **Zhang, Y.**, Crystal Structure of Human CD38 in Complex with 4'-Thioribose NAD<sup>+</sup>. 2018, **PDB ID: 6EDR**.
3. Dai, Z., Zhang, X.N., Nasertorabi, F., Han, G.W., Stevens, C.R., **Zhang, Y.**, X-ray structure of human CD38 catalytic domain with 2'-Cl-araNAD<sup>+</sup>. 2020, **PDB ID: 6VUA**.

### **Patents:**

1. **Zhang, Y.**, Humanized Cathepsin Inhibitors. Provisional Application, filed on July 10, 2020
2. **Zhang, Y.**, Dai, Z. and Zhang, X.N. Site-Specific Antibody-Drug Conjugates by ADP-Ribosyl Cyclases. Provisional Application, filed on May 8, 2020
3. **Zhang, Y.** Functionalized Poly-ADP-Ribose Polymers for Drug Delivery. PCT Application, filed on March 27, 2020
4. **Zhang, Y.** Genetically Modified Exosomes for Immune Modulation. PCT Application, filed on March 27, 2020
5. **Zhang, Y.**, Dai, Z. and Zhang, X.N. 4-Thioribose NAD Analogues and Methods of Synthesizing and Using the Same, PCT Application, filed on October 4, 2019
6. **Zhang, Y.**, Shi, X., and Cheng, Q., Synthetic Extracellular Vesicles for Novel Therapies, PCT Application, filed on July 26, 2018
7. **Zhang, Y.** and Zhang, X-N., Nicotinamide Adenine Dinucleotide Analogues, PCT Application, filed on June 9, 2018
8. **Zhang, Y.** and Chen, J., An ELISA-Like Assay for Quantifying Enzymatic Activities of Mono-ADP-Ribosyltransferases, PCT Application, filed on September 27, 2017
9. **Zhang, Y.** and Dai, Z., Methods of Constructing Immunoglobulin Fusion Proteins Inhibiting Cathepsin B and Compositions Thereof, PCT Application, filed on March 31, 2017
10. Wang, F., **Zhang, Y.**, Wang, Y., Liu, Y. and Schultz, P., Coiled Coil Immunoglobulin Fusion Proteins and Compositions Thereof, PCT Application, filed on July 11, 2014.

11. Wang, F., **Zhang, Y.**, Liu, T., Wang, Y., Du, J., Liu, Y. and Schultz, P., Immunoglobulin Fusion Proteins and Compositions Thereof, PCT Application, filed on July 11, 2014.
12. Wang, F., **Zhang, Y.** and Schultz, P. Bovine Fusion Antibodies, PCT Application, filed on January 10, 2014.
13. Bazirgan, O.A., Mao, H.H., Smider, V., Ekiert, D., Schultz, P., Wang, F., Wilson, I. and **Zhang, Y.** Ultralong Complementarity Determining Regions and Uses Thereof, PCT Application, filed on January 9, 2013.

#### **Research Support:**

USC Undergraduate Research Associates Program Grant "Novel Therapeutic Antibodies for Prostate Cancer" (PI: <b>Y. Zhang</b> )	07/01/20 – 06/30/21	\$6,600
USC Sharon L. Cockrell Cancer Research Fund "Novel Antibody Drugs for Targeted Cancer Therapies" (PI: <b>Y. Zhang</b> )	07/01/17 – 06/30/21	\$5,000
STOP CANCER Research Career Development Award "Development of Novel Cancer Immunotherapeutics" (PI: <b>Y. Zhang</b> )	02/01/18 – 01/31/21	\$150,000
USC School of Pharmacy Interdisciplinary Research Award "CD99/FLT3 Bispecific Antibodies, New Immunotherapy for Acute Myeloid Leukemia" (Co-I: <b>Y. Zhang</b> )	10/01/18 – 09/30/20	\$34,456
Department of Defense CDMRP Career Development Award "Developing Novel Immunotherapeutics for Acute Myeloid Leukemia" (PI: <b>Y. Zhang</b> )	07/01/19 – 06/30/22	\$593,996
CBCRP Innovative Development and Exploratory Award "Immunotherapeutic Exosomes for Triple Negative Breast Cancer" (PI: <b>Y. Zhang</b> )	08/01/19 – 01/31/21	\$247,500
USC Norris Comprehensive Cancer Center Pilot Grant "Developing a Novel Therapy for Hispanic Americans with Colorectal Cancer" (PI: <b>Y. Zhang</b> )	04/22/20 – 04/21/21	\$50,000
USC Stevens Technology Advancement Grant "Novel Site-Specific Antibody-Drug Conjugates for Targeted Therapy" (PI: <b>Y. Zhang</b> )	07/01/20 – 06/30/21	\$50,000
NIGMS Maximizing Investigators' Research Award (MIRA) (R35) "Chemistry and Biology of ADP-Ribosylation-Dependent Signaling" (PI: <b>Y. Zhang</b> )	07/01/20 – 06/30/25	\$1,907,165
USC Ming Hsieh Institute for Engineering Medicine for Cancer "Combating COVID- 19 with Novel Vaccines" (PI: <b>Y. Zhang</b> )	07/01/20 – 08/31/21	\$85,000

#### **Completed Research Grant:**

Chinese American Faculty Association Faculty Development Grant "Toward the Roles of PARP-14 in Cancer Pathogenesis" (PI: <b>Y. Zhang</b> )	03/07/15 – 03/06/16	\$2,000
USC Undergraduate Research Associates Program Grant "Endogenous Targets of PARP-16 and Novel Therapeutic Tools for Breast Cancer" (PI: <b>Y. Zhang</b> )	07/01/15 – 06/30/16	\$3,200
USC Ming Hsieh Institute for Engineering Medicine for Cancer "Engineering Exosome Nanoparticles for Targeted Cancer Therapies" (PI: <b>Y. Zhang</b> )	07/01/15 – 08/30/16	\$120,000
USC Undergraduate Research Associates Program Grant "Profiling PARP-16-Centered Interactome in Cancer Cells" (PI: <b>Y. Zhang</b> )	07/01/16 – 06/30/17	\$6,400
USC Research Center for Liver Diseases (NIH 2P30DK048522) "Role of PARP14 in Hepatocarcinogenesis" (PI: <b>Y. Zhang</b> )	03/01/16/ – 02/28/18	\$100,000
USC Undergraduate Research Associates Program Grant "Delineating Cellular ADP-Ribosylation for Novel Cancer Therapies" (PI: <b>Y. Zhang</b> )	07/01/17 – 06/30/18	\$4,800
USC Ming Hsieh Institute for Engineering Medicine for Cancer "Developing Novel Immuno-nanoparticles for Colorectal Cancer" (PI: <b>Y. Zhang</b> )	07/01/17 – 08/30/18	\$130,000

American Cancer Society Institutional Research Grant “Novel Immunotherapeutics Targeting Human Breast Cancers” (PI: Y. Zhang)	09/01/17 – 08/31/18	\$30,000
V Foundation Scholar Grant “Mapping PARP14-based Interactome in Cancer Cells” (PI: Y. Zhang)	11/01/16 – 11/01/18	\$200,000
USC Ming Hsieh Institute for Engineering Medicine for Cancer “Development of Novel Immunotherapeutics for Breast Cancer” (PI: Y. Zhang)	07/01/18 – 08/31/19	\$140,000
American Association of Pharmaceutical Scientists (AAPS) Foundation New Investigator Grant “Targeting Metastatic Colorectal Cancer with Novel Immuno-Nanoparticles” (PI: Y. Zhang)	08/01/17 – 07/31/19	\$40,000
USC Undergraduate Research Associates Program Grant “Targeting Hepatocellular Carcinoma with Inhibitory Antibodies” (PI: Y. Zhang)	07/01/18 – 06/30/19	\$5,500
USC Stevens Technology Advancement Grant “Pharmacology of Immunotherapeutic Exosomes” (PI: Y. Zhang)	07/01/18 – 06/30/19	\$50,000
PhRMA Foundation Research Starter Grant in Translational Medicine and Therapeutics “Novel Immunotherapeutics for Colorectal Cancer” (PI: Y. Zhang)	09/01/18 – 08/31/19	\$100,000
V Foundation Scholar PLUS Grant “Mapping Post-Translational Modification-Dependent Interactome in Cancer Cells” (PI: Y. Zhang)	02/01/19 – 01/31/20	\$100,000
AACR-Bayer Innovation and Discovery Grant “Targeting Renal Cell Carcinoma with Novel Immunotherapeutics” (PI: Y. Zhang)	07/01/19 – 06/30/20	\$25,000
USC Undergraduate Research Associates Program Grant “Targeting Hepatocellular Carcinoma with Inhibitory Antibodies” (PI: Y. Zhang)	07/01/19 – 06/30/20	\$4,650
USC School of Pharmacy New Faculty Start-up Fund (PI: Y. Zhang)	12/01/14 – 06/30/20	
TRDRP New Investigator Award “Novel Immunotherapeutics for Cigarette-Smoking Associated Acute Myeloid Leukemia” (PI: Y. Zhang)	09/01/19 – 08/14/20	\$330,000

### **Invited Talks:**

1. Engineering Extracellular Vesicles for Breast Cancer Immunotherapy, USC Breast Cancer Program Meeting, November 2019
2. Devising Artificial Biomolecules at the Interface of Chemistry and Biology, the Minority Opportunities in Research (MORE) Programs at California State University, Los Angeles, CA, October 2019
3. Developing Novel Immunotherapeutics for Cancer, Fulgent Pharma, Temple City, CA, October, 2018
4. From Bench to Clinical Applications: Money Talks, USC Center for Excellence in Research, October 2018
5. CD99/FLT3 Bispecific Antibodies, New Immunotherapy for Acute Myeloid Leukemia, USC School of Pharmacy Board of Councilors Meeting, Rancho Palos Verdes, CA, October, 2018
6. Development of Novel Cancer Immunotherapeutics, Genentech-STOP CANCER Annual Research meeting, April 2018
7. Elucidating the Role of Protein ADP-Ribosylation in Hepatocellular Carcinoma, USC Research Center for Liver Diseases 22<sup>nd</sup> Annual Symposium, March 2018
8. Targeting Extracellular Proteases with Novel Therapeutic Antibodies, USC Factor Meeting, November, 2017
9. Targeting Extracellular Proteases with Novel Antibody Therapeutics for Breast Cancer, USC Breast Cancer Program Meeting, August 2017
10. Systematic Deciphering of Epigenetic Landscape in Hepatocellular Carcinoma, USC Research Center for Liver Diseases 21<sup>st</sup> Annual Symposium, March 2017



11. Role of PARP14 in Hepatocarcinogenesis, USC Research Center for Liver Diseases 20<sup>th</sup> Annual Symposium, January 2016
12. Rational Design of Humanized Agonist Antibodies, 13<sup>th</sup> Annual Discovery on Target-Antibodies against Membrane Protein Targets, Boston, MA, September 2015
13. Rational Design of Novel Biomolecules for Drug Discovery, Translational and Clinical Sciences Program, USC Norris Comprehensive Cancer Center, July 2015
14. Investigating and Engineering Novel Biomolecules for Drug Discovery, Department of Chemistry, University of Southern California, CA, February 2015
15. Investigating and Engineering Novel Biomolecules for Drug Discovery, School of Life Sciences, Shandong University, China, September 2014
16. Expanding the Repertoire of Antibody CDR Fusion Proteins for Long-Lived Therapeutics, Rising Stars Symposium in Chemical Biology, University of Utah, Salt Lake City, UT, December 2013
17. Transition State Structures of *Plasmodium falciparum* and Human Orotate Phosphoribosyltransferases, Gordon Research Conferences – Isotopes in Biological & Chemical Sciences, Ventura, CA, February 2008.

### **Conference Poster Presentations:**

1. Zhang, X.N., Cheng, Q., Chen, J., Lam, A.T., Lu, Y., Dai, Z., Pei, H., Evdokimov, N.M., Louie, S.G. and **Zhang, Y.** Novel Ribose-Functionalized NAD<sup>+</sup> for Studying Protein ADP-Ribosylation. Gordon Research Conferences – Nucleosides, Nucleotides and Oligonucleotides, Newport, RI, June 2019.
2. Cheng, Q., Shi, X., Han, M., Smbatyan, G., Lenz, H.J. and **Zhang, Y.** Reprogrammed Exosomes for Cancer Immunotherapy. Innovation Summit of University of Southern California, Los Angeles, CA, March 2019
3. Lam, A.T., Zhang, X.N., Chen, J., Cheng, Q., Pei, H., Louie, S.G. and **Zhang, Y.** Bifunctional NAD Analogue for Profiling ADP-ribose Interacting Proteins. 2018 Southern California Biomedical Sciences Graduate Student Symposium, Los Angeles, CA, October 2018
4. Cheng, Q., Shi, X., Han, M., Smbatyan, G., Lenz, H.J. and **Zhang, Y.** Developing Novel Immunotherapeutics for Cancer. Ming Hsieh Institute Symposium for Research on Engineering-Medicine for Cancer Moving Cancer Research into Clinical Trials, Pasadena, CA, October 2018
5. Shi, X., Cheng, Q. and **Zhang, Y.** Reprogramming Exosome as Novel Immunotherapy for Breast Cancer. (selected podium presentation) GPEN2018 Conference, National University of Singapore, Singapore, September 2018
6. Lam, A.T., Zhang, X.N., Chen, J., Cheng, Q., Pei, H., Louie, S.G. and **Zhang, Y.** Bifunctional NAD Analogue for Profiling ADP-ribose Interacting Proteins. Moving Targets Symposium, Los Angeles, CA, August 2018
7. **Zhang, Y.**, Cheng, Q., and Zhang, X-N., Novel Chemical Tools for Tracking Protein ADP-Ribosylation in Live Cells. Gordon Research Conferences – Bioorganic Chemistry, Andover, NH, June 2017.
8. Chen, J. and **Zhang, Y.** Developing Novel Antibody-Drug Conjugates for Targeted Cancer Therapy, GPEN2016 Conference, Lawrence, KA, November 2016
9. **Zhang, Y.**, Wang, D., de Lichtervelde, L., Sun, S.B., Smider, V.V., Schultz, P.G. and Wang, F. Engineering Antibodies with Ultralong CDR3 Loops for Enhanced Pharmacological Properties, Gordon Research Conferences – Enzymes, Coenzymes & Metabolic Pathways, Waterville Valley, NH, July 2014.
10. **Zhang, Y.**, Wang, D., de Lichtervelde, L., Sun, S.B., Smider, V.V., Schultz, P.G., Wang, F. Engineering Antibodies with Ultralong CDR3 Loops for Enhanced Pharmacological Properties. Gordon Research Conferences – Bioorganic Chemistry, Andover, NH, June 2013.
11. **Zhang, Y.**, Wang, D., de Lichtervelde, L., Sun, S.B., Smider, V.V., Schultz, P.G. and Wang, F. The Origin and Therapeutic Application of a Novel CDR3H Domain-containing Antibody, Gordon Research Conferences – Enzymes, Coenzymes & Metabolic Pathways, Waterville Valley, NH, July 2012.

12. **Zhang, Y.** and Schramm, V.L. Leaving Group Activation and PPi Ionic State at the Catalytic Site of *Plasmodium falciparum* Orotate Phosphoribosyltransferase, Gordon Research Conferences – Bioorganic Chemistry, Andover, NH, June 2010.
13. **Zhang, Y.** and Schramm, V.L. Pyrophosphate Nucleophilic Participation at the Transition States of *Plasmodium falciparum* and Human Orotate Phosphoribosyltransferases, Gordon Research Conferences – Isotopes in Biological & Chemical Sciences, Galveston, TX, February 2010.
14. **Zhang, Y.**, Evans, G.B., Fröhlich, R.F., Cassera, M.B., Tyler, P.C. and Schramm, V.L. Targeting Pyrimidine Synthesis in *Plasmodium falciparum* with Transition State Analogues of Orotate Phosphoribosyltransferase, Gordon Research Conferences – Malaria, Oxford, United Kingdom, September 2009.
15. Merrill, A., **Zhang, Y.**, Liu, S. and Lajoie, G. Characterization of the Diphthamide Modification on Site-Directed Mutants of Eukaryotic Elongation Factor 2 by Mass Spectrometry, VII European Symposium of the Protein Society – From Proteins to Proteome, Stockholm, Sweden, May 2007.

### **Lab Personnel:**

#### **Current lab members:**

Dr. Xiao-Nan Zhang (Postdoctoral researcher)  
 Dr. Qinqin Cheng (Postdoctoral researcher)  
 Albert Lam (PhD student)  
 Zhefu Dai (PhD student)  
 Jiawei Li (PhD student)  
 Elisa Stephens (PhD student)  
 Tianxiao Zhang (Master student)  
 Won Sek Lee (Undergraduate student)  
 Sean Lee (Undergraduate student)

#### **Former lab members:**

Larry Rodriguez (PhD rotation student), 06/2015 – 12/2015  
 Xianhui Chen (PhD rotation student), 09/2015 – 12/2015  
 Xueyuan Jing (PhD rotation student), 01/2018 – 03/2018  
 Christian Rabot (PhD rotation student), 01/2018 – 03/2018  
 Connor Hurd (PhD rotation student), 03/2018 – 04/2018  
 Eunjin Hong (PhD rotation student), 03/2018 – 04/2018  
 Wilson Lee (PhD rotation student), 01/2019 – 04/2019  
 Ryan Van Damme (PhD rotation student), 03/2019 – 04/2019  
 Brandon Ebright (PhD rotation student), 09/2019 – 12/2019  
 Jingwen (Julianna) Chen (PhD student), 01/2015 – 05/2019  
 Xiaojing Shi (PhD student), 03/2015 – 05/2020  
 Chun (Michael) Chen (PharmD student), 09/2019 – 12/2019  
 Menglu Han (Master student), 03/2015 – 06/2016  
 Aliya Anvery (Master student), 06/2015 – 08/2015  
 Rui Wu (Master student), 09/2015 – 12/2015  
 Yanran Lu (Master student), 09/2015 – 05/2017  
 Tianling Hou (Master student), 09/2017 – 05/2019  
 Xinping Duan (Master student), 09/2018 – 05/2020  
 Yiling Wang (Master student), 09/2018 – 05/2020  
 Connie Kim (Undergraduate student), 01/2015 – 05/2015  
 Sungwon Byun (Undergraduate student), 01/2016 – 05/2016  
 Jaynelle Gao (Undergraduate student), 06/2016 – 08/2016  
 Devin Zhao (Undergraduate student), 06/2016 – 08/2016  
 Joseph Tuan (Undergraduate student), 09/2016 – 12/2017  
 Jason Tsoi (Undergraduate student), 06/2017 – 08/2017  
 Qiuyang (Annie) Chen (Undergraduate student), 01/2017 – 12/2017

Alice Lee (Undergraduate student), 08/2017 – 11/2017  
Itzel Ortega (Undergraduate student), 05/2018 – 08/2018  
Amanda Shen (Undergraduate student), 10/2018 – 04/2019  
Cindy Yang (Undergraduate student), 01/2019 – 04/2019  
Brandon Irie (Undergraduate student), 09/2019 – 11/2019  
Shivani Daftary (Undergraduate student), 04/2019 – 05/2020  
Chen Niu (Visiting undergraduate student from China Pharmaceutical University), 01/2017 – 05/2017  
Kevin Duong (SURF Undergraduate student from University of Illinois Urbana-Champaign), 05/2018 – 08/2018  
Stephanie George (Francisco Bravo Medical Magnet High School), 06/2017 – 05/2018