Curriculum Vitae

(updated April 9, 2024)

Peter Z. Qin

Department of Chemistry
University of Southern California
TRF 119, 3430 S. Vermont Ave.,
Los Angeles, CA 90089

Tel: (213) 821-2461
Fax: (213) 740- 2701
E-mail: pzq@usc.edu

Employment

2022 – present	**Chair**, Department of Chemistry, University of Southern California
2018 – present	**Professor**, Department of Chemistry, University of Southern California
2017 – 2022	**Vice Chair of Undergraduate Education**, Department of Chemistry, University of Southern California
2009 – 2018	**Associate Professor**, Department of Chemistry, University of Southern California
2002 – 2009	**Assistant Professor**, Department of Chemistry, University of Southern California

Education

1991	**B.S.**,	Physics,	Peking University, Beijing, China.
1999	**Ph.D.**,	Biophysics,	Columbia University, New York, USA.

Research Experience

1999 - 2002	**Postdoctoral fellow** with **Dr. Wayne L. Hubbell**, Department of Chemistry and Biochemistry, University of California, Los Angeles.
1992 - 1999	**Graduate student** with **Dr. Anna M. Pyle**, Department of Applied Physics and Department of Biochemistry & Molecular Biophysics, Columbia University.

Honors and Fellowships

2006-2011	National Science Foundation CAREER award
1999-2002	DuPont Pharmaceutical Fellow of Life Science Research Foundation.
1991	Outstanding Graduate Award, Peking University.

Grant Support

Active

Project Title:	Elucidating the Role of DNA Shape in CRISPR Target Discrimination.
Funding Agency (PI):	NIH R35 GM145341
Funding Period:	05/01/2022 – 02/28/2027
Total Cost:	$2,062,500

Project Title:	Dissecting contribution of Cas9-induced DNA unwinding to specificity in gene editing.
Funding Agency (PI):	NSF MCB-1818107 (Qin)
Funding Period:	08/01/2018 – 07/31/2022 (NCE 07/31/2024)
Total Cost:	$700,000

Project Title:	USC CHEMISTRY Department Demonstration Project: Implementing Effective Evaluation of Teaching and Learning in the private R1 university context
Funding Agency (PI):	Association of American Universities (Bradforth; Qin)
Funding Period:	04/01/2022 – 03/31/2025
Total Cost:	$100,000

Project Title:	Beckman Scholars Program at USC Chemistry
Funding Agency (PI):	Arnold and Mabel Beckman Foundation (Qin; Prakash)
Funding Period:	01/01/2021 – 12/30/2023 (NEC 08/31/2024)
Total Cost:	$156,000

Concluded

Project Title:	Dornsife Instrumentation Program: Supplemental Funding for Acquisition of a Bench-Top EPR Spectrometer
Funding Agency (PI):	USC Dornsife (Qin)
Funding Period:	9/20/2022 – 2/1/2023
Total Cost:	$25,000

Project Title:	Supplement: Acquisition of a Multi-Mode Microplate Reader
Funding Agency (PI):	NIH 3R01GM124413-04S1 (Qin)
Funding Period:	05/01/2021 – 12/31/2022
Total Cost:	$37,827

Project Title:	Investigating mechanisms of DNA unwinding and recognition by a CRISPR-Cas nuclease.
Funding Agency (PI):	NIH R01 GM124413 (Qin)
Funding Period:	08/05/2018 – 12/31/2022
Total Cost:	$1,275,280

Project Title:	Collaborative Research: Mechanisms of RNA-directed activation of a Cas9 nuclease competent for DNA interrogation.

Funding Agency (PI):	NSF MCB-1716744 (Qin)
Funding Period:	09/15/2017 – 08/31/2022
Total Cost:	$271,411

Project Title:	Supplemental Funding Request for Purchasing a Cryogen-Free Variable-Temperature System
Funding Agency (PI):	Anton B. Burg Foundation (Qin)
Funding Period:	12/22/2019 – 12/21/2020
Total Cost:	$25,000

Project Title:	Dynamics of Large RNAs Studied Using Site-Directed Spin Labeling.
Funding Agency (PI):	NSF CHE-1213673 (Qin)
Funding Period:	07/15/2012 – 06/30/2017
Total Cost:	$354,750

Project Title:	REU Site: Snapshots of Chemistry – Visualization of Processes at the Molecular Level
Funding Agency (PI):	NSF CHE-1156836 (Qin)
Funding Period:	08/01/2012 – 07/31/2017
Total Cost:	$270,000

Project Title:	Acquisition of a Pulse Electron Paramagnetic Resonance Spectrometer.
Funding Agency (PI):	NIH S10 RR028992 (Qin)
Funding Period:	12/07/2009 – 12/06/2011
Total Cost:	$1,039,916

Project Title:	Administrative supplement of R01GM069557
Funding Agency (PI):	NIH/NIGMS 5R01GM069557-03 (Qin)
Funding Period:	08/01/2009 – 07/31/2010
Total Cost:	$84,833

Project Title:	Measuring nanometer distances in the packaging RNA using Double Electron-Electron Resonance.
Funding Agency (PI):	Environmental Molecular Sciences Laboratory, DOE (Qin)
Funding Period:	10/1/2006 – 11/30/2010
Total Cost:	Instrument time on pulse EPR system

Project Title:	Structure, dynamics, and function of the packaging RNA.

Funding Agency (PI):	NIH R01 GM069557 (Qin)
Funding Period:	08/01/2006 – 07/31/2013
Total Cost:	$1,301,125

Project Title:	CAREER: Site-directed spin labeling studies of conformation and dynamics of the packaging RNA.
Funding Agency (PI):	NSF MCB-0546529 (Qin)
Funding Period:	09/15/2006 – 08/31/2012
Total Cost:	$685,676

Project Title:	A novel site-directed spin labeling method for mapping non-B-DNA structure at the bcl-2 major breakpoint region.
Funding Agency (PI):	American Cancer Society IRG-58-007-45 (Qin)
Funding Period:	12/21/2005 – 12/20/2006
Total Cost:	$20,000

Project Title:	Site-directed spin labeling studies of the packaging RNA, an energy converter in a biological motor.
Funding Agency (PI):	American Chemical Society PRF 39623 – G4 (Qin)
Funding Period:	5/1/2003 – 8/31/2005
Total Cost:	$35,000

Project Title:	Site-directed spin labeling studies of the packaging RNA, an energy converter in a biological motor.
Funding Agency (PI):	Zumberge Research Grant, USC (Qin)
Funding Period:	7/1/2003 – 6/30/2004
Total Cost:	$25,000

Publications

68) Sun, J., Rustom, M., Nguyen, T.D., Singh, J., **Qin, P.Z**., Sideris, C.*, "A Portable Dual-Mode Pulse and Continuous-Wave Electron Paramagnetic Resonance Spectrometer using a Subharmonic Direct Conversion Receiver," accepted for *IEEE Intl. Solid-State Circuits Conf.*, Feb 2024.

67) Zhang, M., Feng, J., Li, Y., **Qin, P.Z**., and Chai, Y.*, (2023), "Generation of tamoxifen-inducible Tfap2b-CreERT2 mice using CRISPR-Cas9." *Genesis,* e23582.

66) Newsom, S.N., Wang, D., Rostami, S., Schuster, I., Parameshwaran, H.P., Joseph, Y.G., **Qin, P.Z**., Liu, J.,* Rajan, R.*, (2023), "Differential divalent metal binding by SpyCas9's RuvC active site contributes to non-specific DNA cleavage." *CRISPR J.*, 6, 527-542.

65) Siegel, A., Singh, J., **Qin, P.Z.***, and Shan, Shu-ou* (2023), "Chapter 10: EPR Studies of Chaperone Interaction and Dynamics." in *Biophysics of Molecular Chaperones: Function,*

Mechanisms and Client Protein Interactions (ed. S. Hiller, M. Liu, and L. He, Royal Society of Chemistry), 29, 242-277.

64) Li, Y., Cooper, B. H., Liu, L., Wu, D., Zhang, X., Rohs, R., **Qin, P.Z**.*; (2023) "CRISPR-Cas9 Activities with Truncated 16-Nucleotide RNA Guides Are Tuned by Target Duplex Stability Beyond the RNA/DNA Hybrid." *Biochemistry*, 62, 2541–2548.

63) Singh, J., Liu, K.G., Allen, A., Jiang, W., **Qin, P.Z**.*; (2023), "A DNA Unwinding Equilibrium Serves as a Checkpoint for CRISPR-Cas12a Target Discrimination." *Nucleic Acids Res.*, 51, 8730–8743.

62) Hu, Y.; Wang, T.; Singh, J.; Sun, R.; Xu, L.; Niu, X.; Huang, K.; Bai, G.; Liu, G.; Zuo, X.; Chen, C.; **Qin, P.Z.**; Fang, X.*; (2022) "Phosphorothioate-Based Posttranscriptional Site-Specific Labeling of Large RNAs for Structural and Dynamic Studies." *ACS. Chem. Biol.*, 17, 2448–2460.

61) Li, Y., Liu, Y., Singh, J., Tangprasertchai, N.S., Trivedi, R., Fang, Y., and Qin, P.Z.* (2022) "Site-Specific Labeling Reveals Cas9 Induces Partial Unwinding Without RNA/DNA Pairing in Sequences Distal to the PAM." *CRISPR J*., 5, 341-352.

60) Babu, K.; Kathiresan, V.; Kumari, P.; Newsom, S.; Parameshwaran, H. P.; Chen, X.; Liu, J.; **Qin, P.Z**.*; Rajan, R.* (2021) "Coordinated Actions of Cas9 HNH and RuvC Nuclease Domains Are Regulated by the Bridge Helix and the Target DNA Sequence." *Biochemistry*, 60, 3783–3800.

59) Parameshwaran, H. P., Babu, K., Tran, C., Guan, K., Allen, A., Kathiresan, K, **Qin, P.Z.**, Rajan, R.*, (2021), "Bridge helix of Cas12a imparts selectivity for cis-DNA cleavage and regulates trans-DNA cleavage." *FEBS Lett.*, 595, 892-912.

58) Wang, Y., Kathiresan, V., Chen, Y., Hu, Y., Jiang, W., Bai, G., Liu, G., **Qin, P.Z.***, Fang, X.*, (2020), "Posttranscriptional site-directed spin labeling of large RNAs with an unnatural base pair system under non-denaturing conditions." *Chem. Sci.*, 11, 9655-9664.

57) Ameri, H.,* Murat, C., Arbabi, A., Jiang, W., Janga, S.R., **Qin, P.Z.**, Hamm-Alvarez, S.F., (2020), "Reduced Expression of VEGF-A in Human Retinal Pigment Epithelial Cells and Human Muller Cells Following CRISPR-Cas9 Ribonucleoprotein-Mediated Gene Disruption." *Trans. Vis. Sci. Tech.* 9, 23.

56) Jiang, W., Singh, J., Allen, A., Li, Y., Kathiresan, V., Qureshi, Q., Tangprasertchai, N., Zhang, X., Parameshwaran, H.P., Rajan, R., **Qin, P. Z**.* (2019), "CRISPR-Cas12a Nucleases Bind Flexible DNA Duplexes without RNA-DNA Complementarity." *ACS Omega*, 4, 17140-17147.

55) Ding, Y., Kathiresan, V., Zhang, X., Haworth, I.S.; **Qin, P. Z**.* (2019), "Experimental Validation of the ALLNOX Program for Studying Protein-Nucleic Acid Complexes." *J. Phys. Chem., A*, 123, 3592-3598.

54) Babu, K., Amrani, N., Jiang, W., Yogesha, S.D., Nguyen, R., **Qin, P. Z**., Rajan R.* (2019), "Bridge Helix of Cas9 Modulates Target DNA Cleavage and Mismatch Tolerance." *Biochemistry*, 58, 1905-1917.

53) Shi, F., F. Kong, P. Zhao, X. Zhang, M. Chen, S. Chen, Q. Zhang, M. Wang, X. Ye, Z. Wang, Z. Qin, X. Rong, J. Su, P. Wang, **Qin, P.Z.**,* and Du, J.* (2018), "Single DNA Electron Spin Resonance Spectroscopy in Aqueous Solutions." *Nat. Meth*., 15, 697-699.

52) Zhong, Y.F., Zhang, H., Liu, W.T., Zheng, X.H., Zhou, Y.W., Cao, Q., Shen, Y., Zhao, Y., **Qin, P.Z.**, Ji LN, Mao, Z.W. (2017), "A Platinum(II)-based photosensitive tripod as an effective photodynamic anticancer agent via DNA damage." *Chem. Eur. J.,* 23, 16442 – 16446.

51) Tangprasertchai, N.S., Di Felice, R., Zhang, X., Slaymaker, I.M., Reyes, C.V., Jiang, W., Rohs, R., and **Qin, P. Z.*** (2017), "CRISPR-Cas9 mediated DNA unwinding detected using site-directed spin labeling." *ACS Chem. Biol.*, 12, 1489–1493.

50) Yang, J., Cao, Q.,* Hu, W.L., Ye, R.R., He, L., Ji, L.N., **Qin, P. Z**., and Mao, Z.W.* (2017), "Theranostic TEMPO-functionalized Ru(ii) complexes as photosensitizers and oxidative stress indicators." *Dalton Trans*., 46, 445-454.

49) Cao, Q., Li, Y., Freisinger, E., **Qin, P.Z**.*, Sigel,R.K.O.*, and Mao, M.Z.*, (2017) "G-quadruplex DNA targeted metal complexes acting as potential anticancer drugs." *Inorg. Chem. Front.,* 4, 10-32.

48) Vazquez Reyes, C., Tangprasertchai, N.S., Yogesha, S.D., Nguyen, R.H., Zhang, X., Rajan, R. and **Qin, P. Z.***, (2017) "Nucleic-acid dependent conformational changes in CRISPR-Cas9 revealed by site-directed spin labeling." *Cell Biochem Biophys,* 75, 203-210.

47) Akiel, R.D., Zhang, X., Abeywardana, C., Stepanov, V., **Qin, P.Z.***, and S. Takahashi*, (2016), "Investigating Functional DNA Grafted on Nanodiamond Surface Using Site-Directed Spin Labeling and Electron Paramagnetic Resonance Spectroscopy". *J. Phys. Chem. B,* 120, 4003–4008.

46) Xu, C.X., Zhang, X., Zhou, Y., Wang, H., Cao, Q., Shen, Y., Ji, L., Mao, Z. W.*, **Qin, P.Z.***, (2016), "A nitroxide tagged platinum(II) complex enables the identification of DNA G-quadruplex binding mode". *Chem. Eur. J.,* 22, 3405-13.

45) Zhang, X., Xu, C., Di Felice, R., Sponer, J., Islam, B., Stadlbauer, P. Ding, Y., Mao, L., Mao, Z.W., and **Qin, P.Z.***, (2016), "Conformations of Human Telomeric G-quadruplex Studied Using A Nucleotide-Independent Nitroxide Label". *Biochemistry,* 55, 360-72.

44) Franck, J. Ding, Y.; Stone, K.; **Qin, P.Z.***, Han, S.*, (2015), "Anomalously rapid hydration water diffusion dynamics found near DNA surfaces". *J. Am. Chem. Soc.,* 137, 12013-23.

43) Tangprasertchai, N. S., Zhang, X., Ding, Y., Tham, K., Rohs, R., Haworth, I. S., and **Qin, P. Z.***(2015). An Integrated Spin-Labeling/Computational-Modeling Approach for Mapping Global Structures of Nucleic Acids. *Method Enzymol.* 564, 427-453

42) Beasley, K. N., Sutch, B.T., Hatmal, M., Langen, R., **Qin, P.Z.**, Haworth, I.S.*, (2015), "Computer modeling of spin labels: NASNOX, PRONOX and ALLNOX", *Method Enzymol.* 563, 569-593

41) Nguyen, P.H., Popova, A.M., Hideg, K. and **Qin, P.Z.***. (2015) A nucleotide-independent cyclic nitroxide probe for monitoring segmental motions in nucleic acids. *BMC biophysics,* 8, 6.

40) Zheng, X.-H., Cao, Q., Ding, Y.-L., Zhong, Y.-F., Mu, G., **Qin, P.Z.**, Ji, L.-N. and Mao, Z.-W.*, (2015) "Platinum(II) clovers targeting G-quadruplexes and their anticancer activities." *Dalton Trans*., 44, 50–53.

39) Ding, Y., Nguyen, P., Tangprasertchai, N.S., Reyes, C.V., Zhang, X., and **Qin, P. Z.***, (2015), "Nucleic Acid Structure and Dynamics: Perspectives from Site-Directed Spin Labeling". *Electron Paramag. Reson.*, 24, 122–147.

38) Ding, Y., Zhang, X., Tham, K.W., and **Qin, P. Z.***, (2014) "Experimental mapping of DNA duplex shape enabled by global lineshape analyses of a sequence-independent nitroxide probe", *Nucleic Acid Res.,* 42*,* e140.

37) Xu, C.X., Shen, Y., Hu, Q., Zheng, Y.X., Cao, Q., **Qin, P.Z.**, Zhao, Y., Ji, L.N., and Mao, Z.W.*, (2014) "Stabilization of Human Telomeric G-Quadruplex and Inhibition of Telomerase Activity by Propeller-Shaped Trinuclear Pt(II) Complexes", *Chem Asian J.* 9, 2519-2526.

36) Zhang, X., Machado, A.D.C, Ding, Y., Chen, Y., Lu, Y., Tham, K.W., Chen, L., Rohs, R.*,

and **Qin, P. Z.***, (2014), "Conformation of a p53 Response Element Deduced Using Site-Directed Spin Labeling and Monte Carlo Sampling." *Nucleic Acid Res., **42**, 2789-2797.*

35) Nguyen, P., Shi, X., Sigurdsson,S.T., Herschlag, D., **Qin, P. Z.***, (2013), "A single-stranded junction modulates nanosecond motional ordering of the substrate recognition duplex of a group I ribozyme.", *ChemBioChem,* **14**, 1720-1723.

34) Chen, Y., Zhang X., Machado, A., Ding, Y., Chen, Z., **Qin, P.Z.**, Rohs, R., Chen, L.*, (2013), "Structure of p53 binding to the BAX response element reveals DNA unwinding and compression to accommodate base-pair insertion." *Nucleic Acid Res.,* **41**, 8368-76.

33) Zhang, X. and **Qin, P. Z.***, (2013) "Studying RNA Folding Using Site-Directed Spin Labeling", in *Biophysics of RNA folding*, 69-87, Russell R, editor. Springer, New York.

32) Popova, A.M., M.m.M. Hatmal, M. Frushicheva, E.A. Price, **Qin, P. Z.***, and I.S. Haworth*, (2012) "Nitroxide Sensing of a DNA Microenvironment: Mechanistic Insights from EPR Spectroscopy and Molecular Dynamics Simulations." *J. Phys. Chem. B*, **116**, 6387–6396.

31) Zhang, X., C.-S. Tung, G.Z. Sowa, M.m.M. Hatmal, I.S. Haworth, and **Qin, P. Z.***, (2012), "Global structure of a three-way junction in a phi29 packaging RNA dimer determined using site-directed spin labeling." *J. Am. Chem. Soc.*, 2012, **134**, 2644–2652.

30) Phuong Nguyen and **Qin, P. Z.***, (2011) "RNA Dynamics: Perspectives from Spin Labels." *Wiley Interdisciplinary Reviews: RNA*, **3**, 62-72.

29) Zhang, X., Lee, S. W., Zhao, L., Xia, T., and **Qin, P. Z.***, (2010) "Conformational distributions at the N-peptide/boxB RNA interface studied using site-directed spin labeling." *RNA*, 16, 2474-2483.

28) Popova, A.M. and **Qin, P. Z.***, (2010) "A nucleotide-independent nitroxide probe reports on site-specific stereomeric environment in DNA." *Biophys. J.*, 99, 2180-2189.

27) Zhang, X., Cekan, P., Sigurdsson, S.T.*, and **Qin, P. Z.***, (2009) "Studying RNA using site-directed spin-labeling and continuous-wave electron paramagnetic resonance spectroscopy." *Method Enzymol.*, 469, 303 - 308.

26) Popova, A.M., Kálai, T., Hideg, K., and **Qin, P. Z.***, (2009) "Site-specific DNA structural and dynamic features revealed by nucleotide-independent nitroxide probes." *Biochemistry*, 48, 8540-8550

25) Grant, G.G., Boyd, N., Herschlag, D., and **Qin, P.Z**.*, (2009) "Motions of the substrate recognition duplex in a group I intron assessed by site-directed spin-labeling". *J. Am. Chem. Soc.,* 131, 3136–3137.

24) Sowa, G.Z. and **Qin, P.Z**.*, (2008) "Site-directed spin labeling studies on nucleic acid structure and dynamics." *Prog. Nucleic Acids Res. Mol. Biol.*, 82, 147-197.

23) Fang, Y., D. Shu, X., Xiao, F, P. Guo, and **Qin, P.Z**.*, (2008) "Modular assembly of chimeric phi29 packaging RNAs that support DNA packaging." *Biochem. Biophy. Res. Comm.*, 372, 589-594.

22) Grant, G., Popova, A., and **Qin, P.Z**.*, (2008) "Diastereomer characterizations of nitroxide-labeled nucleic acids." *Biochem. Biophy. Res. Comm.*, 371**,** 451-455.

21) **Qin, P.Z.***, I. S. Haworth, Q. Cai, A. K. Kusnetzow, G. P. G. Grant, E. A. Price, G. Z. Sowa, A. Popova, B. Herreros, and H. He, (2007) "Measuring nanometer distances in nucleic acids using a sequence-independent nitroxide probe." *Nat. Protocols*, 2, 2354-2365.

20) Cai, Q., A.K. Kusnetzow, K. Hideg, E.A. Price, I.S. Haworth, and **Qin, P.Z.***, (2007) "Nanometer distance measurements in RNA using site-directed spin labeling." *Biophys. J.*, 93, 2110-2117.

19) Price, E.A., Sutch, B.T., Cai, Q., **Qin, P.Z.** and Haworth, I.S.*, (2007) "Computation of Nitroxide-Nitroxide Distances for Spin-Labeled DNA Duplexes." *Biopolymers*, 87, 40 - 50.

18) Grant, G.P. and **Qin, P.Z**.*, (2007) "A Facile Method for Attaching Nitroxide Spin Labels at the 5' Terminus of Nucleic Acids." *Nucleic Acid Res*, 35, e77.

17) Cai, Q., Kusnetzow, A.K., Hubbell, W.L., Haworth, I.S., Gacho, G., Van Eps, N., Hideg, K, Chambers, E.J., and **Qin, P.Z**.*, (2006) "Site-directed spin labeling measurements of nanometer distances in nucleic acids using a sequence-independent nitroxide probe." *Nucleic Acid Res,* 34, 4722 - 4730.

16) **Qin, P.Z**.*, Iseri, J, and Oki, A., (2006) "A model system for investigating lineshape/structure correlations in RNA site-directed spin labeling." *Biochem. Biophy. Res. Comm*., 343, 117-124.

15) Fang, Y., Cai, Q. and **Qin, P.Z.** *, (2005) "The procapsid binding domain of phi29 packaging RNA has a modular architecture and requires 2'-hydroxyl groups in packaging RNA interaction." *Biochemistry,* 44, 9348-9358.

Edited Books

2) **Qin, P.Z.** and Warncke, K. (eds.), (2015), *Methods Enzymol*, 564, "Investigations of Biological Systems by Using Spin Labels, Spin Probes, and Intrinsic Metal Ions, Part B"

1) **Qin, P.Z.** and Warncke, K. (eds.), (2015), *Methods Enzymol*, 564, "Investigations of Biological Systems by Using Spin Labels, Spin Probes, and Intrinsic Metal Ions, Part A"

Research Presentations (from 2015)

Oral Presentations

2023 "Conformational Checkpoints Regulating CRISPR Target Discrimination Revealed by Site-Directed Spin Labeling", Seminar, University of Science and Technology, Hefei, China, May 22, 2023 (invited)

"Unveiling Conformational Checkpoints Regulating CRISPR Target Discriminations", Seminar, Department of Chemistry, Sun Yat-Sen University, Guangzhou, China, May 26, 2023 (invited)

"A DNA Unwinding Equilibrium Serves as a Checkpoint for CRISPR-Cas12a Target Discrimination", 44th International EPR Symposium, Denver, CO., July 23-27, 2023

"Conformational Checkpoints Regulating CRISPR Target Discrimination Revealed by Site-Directed Spin Labeling", 2023 Southern California Users of Magnets (SCUM) Meeting, Los Angeles, CA, September 30, 2023 (invited)

2022 "Connecting DNA Shape with CRISPR Target Discrimination: Mechanistic Insights Informing Applications", 2022 12th International Symposium for Chinese Medicinal Chemists (ISCMC 2022), Guangzhou, China, December 27, 2022 (on-line, invited)

"Site-Directed Spin Labeling Reveals Conformational Checkpoints Regulating CRISPR Target Discrimination", Asia-Pacific EPR/ESR Symposium (APES 2022), Hangzhou, China, November 4-11, 2022 (on-line, invited)

2021 "Site-Directed Spin Labeling Studies on CRISPR Target Recognition: Mechanistic Insights Informing Applications", Modern Development of Magnetic Resonance 2021, Kazan, Russia, November 1 -5, 2021 (on-line, invited)

"Connecting DNA Shape with CRISPR Target Discrimination: Mechanistic Insights Informing Applications", Seminar, Department of Chemistry and Biochemistry, California State Univ., Long Beach, September 29, 2021 (invited)

2020 "Dissecting the Role of CRISPR-Induced DNA Unwinding in Target Acquisition", Molecular Motors Symposium, 64th Biophysical Society Annual Meeting, San Diego, CA, February 15 – 19, 2020 (invited)

2019 "Dissecting the Role of CRISPR-Induced DNA Unwinding in Target Acquisition". Seminar, Department of Molecular, Cellular and Developmental Biology, Yale University, November 22, 2019

"CRISPR-Cas9 mediated DNA unwinding detected using site-directed spin labeling." 42nd International EPR Symposium, Denver, CO, July 22-25, 2019

"Nucleic Acid Recognitions: Perspective from Site-Directed Spin Labeling." Seminar, School of Pharmacology, Peking Univ., Beijing, China, June, 10, 2019

"Nucleic Acid Recognitions: Perspective from Site-Directed Spin Labeling." Seminar, State Key Laboratory of Elemento-Organic Chemistry, Nankai University, Tianjin, China, March 13, 2019

"Nucleic Acid Recognitions: Perspective from Site-Directed Spin Labeling." Seminar, School of Life Sciences, Tianjin Univ., Tianjin, China, March 13, 2019

"An Integrated Spin-Labeling/Computational-Modeling Approach For Mapping Global Structures of Nucleic Acids." 63rd Biophysical Society Annual Meeting, Baltimore, MD, March 2 – 6, 2019 (invited)

2018 **"**Nucleic Acid Recognition by CRISPR-Cas9 Investigated Using Site-Directed Spin Labeling." Seminar, School of Chemistry, Sun Yat-Sen University, Guangzhou, China, June 1, 2018.

"Site-Directed Spin Labeling Studies of Nucleic Acids." Symposium on Single Molecule Magnetic Resonance, University of Science and Technology, Hefei, China, May 29–31, 2018 (invited)

"CRISPR-Cas9 mediated DNA unwinding detected using site-directed spin labeling." 62nd Biophysical Society Annual Meeting, San Francisco, California, February 17-21, 2018

2017 "Site-Directed Spin Labeling Studies of DNA Recognition by CRISPR-Cas9." 20th Conference of the International Society of Magnetic Resonance (ISMAR), Québec, Canada, July 23-28, 2017 (invited)

"Nucleic acid recognitions by proteins and small molecules investigated using site-directed spin labeling." Seminar, Department of Chemistry, North Dakota State University, March 16, 2017

2016 "Nucleic acid recognition by small molecules and proteins investigated using site-directed spin labeling." Southeastern Magnetic Resonance Conference (SEMRC), Atlanta, GA, October 14 – 16, 2016 (invited)

"Nucleic acid recognition by small molecules and proteins investigated using site-directed spin labeling." The 12th SINO-US Chemistry Professors Conference, Guangzhou, China, June 23 – 25, 2016 (invited)

2015 "A nitroxide-tagged Pt(II) complex enables identification of DNA G-quadruplex binding mode." PcifiChem, Honolulu, HI, December 18 – 20, 2015.

"A nitroxide-tagged Pt(II) complex enables identification of DNA G-quadruplex binding mode." 19th Conference of the International Society of Magnetic Resonance (ISMAR), Shanghai, China, August 16 – 21, 2015. (Invited)

"Site-directed spin labeling studies of G-quadruplexes." The 57th Rocky Mountain Conference on Analytical Chemistry, July 26 – 31, 2015

"A nitroxide-tagged Pt(II) complex enables identification of DNA G-quadruplex binding mode." The 17th International Conference on Biological Inorganic Chemistry (ICBIC), Beijing, China, July 20-24, 2015. (Invited)

"Nucleic Acid Structure and Dynamics: Perspectives from Spin Labeling", Seminar, School of Life Sciences, Tsinghua University, Beijing, China, July 13, 2015.

"Site-directed spin labeling studies of G-quadruplexes." 3rd Awaji International Workshop on "Electron Spin Science & Technology: Biological and Materials Science Oriented Applications", Hyogo, Japan, June 14 – 16, 2015. (Invited)

Teaching Activities

Courses taught

General Chemistry (CHEM 105b)

Advanced General Chemistry (CHEM 115b)

Physical Chemistry for Life Sciences (CHEM 432)

Special Topics: Nucleic Acid Structure and Function (CHEM 550)

Biochemistry and Molecular Biology: An Introduction for Chemists (CHEM 519)

Basic Principles of Physical Methods in Biochemistry (CHEM 521)

Advance Chemical Biology Laboratory (CHEM 467)

AIDS Drug Discovery and Development (CHEM 203)

Research advisee

Postdoctoral Fellows:

Glenna Sowa (2006 – 2008; Director, R&D, at Applied Medical)

Xiaojun Zhang (2008 – 2016; Staff, Dept. of Chem, USC)

Vankatesan Kathiresan (2018 – 2020; Research Associate, Cardiff University, UK)

Yue Li (2019 – 2022; Senior Scientist; FutureGen Biopharmaceutical, Beijing, Chian)

Kyu-Yeon Lee (2023 – present)

Graduate Students:

Ph.D.: Qi Cai (2002 – 2007; Director Cell Biology, Kite: A Gilead Company)

Gian Gacho (2004 – 2009; Teacher, Notre Dame Cristo Rey High School)

Anna Popova (2006 – 2011; Staff Scientist, Scripps)

Phuong Nguyen (2009 – 2014; Senior Director, STA Pharmaceutical)

Yuan Ding (2010 – 2015; Staff Scientist, Illumina)

Narin Tangprasertchai (2012 – 2017; Scientist, CareDx, Inc.)

Wei Jiang (2015 – 2019; Senior Scientist, WuXi Biologics, China)

Jaideep Singh (2018 – 2023; Scientist; Nutrien US LLC)

Aleique Allen (2018 – present)
Yukang Liu (2018 – present)
Isabelle Schuster (2020 – present)
Difei Wu (2021 – present)
Hongjian Chang (2023 – present)
Xiao Zhang (2024 - present)

Master's: Arisa Oki (Chemistry, 2002 – 2006; City of Hope)
Bo Young Yoon (Chemistry; 2008 – 2010)
Dewi Sri Hartati (Chemistry, 2008 – 2012; Manager, PT. Prima Duta Sejati)
Carolina Vazquez Reyes (Chemistry, 2014 – 2017; Ciencia Labs)

Undergraduates (total of 35; listed below since 2009):

Richardo Campos (REU 10)*;* Michael Beeler (REU 11); Kenneth Tham (Pharmacy, UCSF); Christina Marvin (REU 12, Graduate Student, UNC Chapel Hill); Lingling Mao (REU 2013, Graduate Student, Northwestern Univ.); David An; Rose (Yuan) Wang; Hanqiang Wang (REU 2014, Graduate Student, Chinese University of Hong Kong); Alyssa Tsenter; Wesley Surento; Omair Qureshi (Med School, USC); Clarissa Tacto; Yukang Liu (REU 2017; Graduate Student; USC); Evan Lum; Daniel Leng; Ravi Trivedi (Med School; Western Michigan Univ.); Kevin Liu; Kailee Shlipak; Richard Shen;

Service Activities

Professional Organization

2019 – present Treasurer, International EPR/ESR Society

Grant referee

NSF (CHE, MCB); NIH; ACS Petroleum Research Fund; Research Corporation; U.S. Civilian Research & Development Foundation; Austrian Science Fund; ETH Zurich Research Commission

Journal referee

JACS; Biochemistry; Nucleic Acids Research; Biophysical Journal; Metabolism; Nature Protocol; Journal of Structural Biology; Angewandte Chemie, J. Phys. Chem., Scientific Report; Chem Eur. J.; J. Polymer Sci; Appl. Mag. Res.;

Meeting Organizer

2006 Platform Chair, 50th Biophysical Society Meeting, Salt City, Utah

2008 Platform Chair, 52nd Biophysical Society Meeting, Long Beach, California

2009 Co-organizer, symposium section on "EPR studies of nucleic acids", 51st Rocky Mountain Conference on Analytical Chemistry, July 26-30, 2009.

2012 Platform Chair, Biophysical Society Meeting, San Diego, CA
2013 Platform Chair, Biophysical Society Meeting, Philadelphia, PA