PENG ZOU, Ph.D.

Associate Professor, Department of Chemical Biology

College of Chemistry and Molecular Engineering, Peking University

5 Yiheyuan Road, Beijing, 100871, China

Office: +86-10-62745395; E-mail: zoupeng@pku.edu.cn

Website: www.zoulab.org

EDUCATION

2007-2012	Ph.D. in Biological Chemistry Department of Chemistry Massachusetts Institute of Technology, Cambridge, MA 02139, USA
2003-2007	B.S. in Chemistry and in Physics College of Chemistry and Molecular Engineering Peking University, Beijing, 100871, China

PROFESSIONAL APPOINTMENTS

2021-now	Associate Professor (with Tenure) College of Chemistry and Molecular Engineering, Peking University, China
2020-now	Junior Investigator Chinese Institute of Brain Research, Beijing, China
2015-now	Principal Investigator Synthetic and Functional Biomolecules Center, Peking University, China PKU-Tsinghua Center for Life Sciences, Peking University, China PKU-IDG/McGovern Institute for Brain Research, Peking University, China
2015-2021	Assistant Professor (Tenure-track) College of Chemistry and Molecular Engineering, Peking University, China
2013-2015	Postdoctoral Fellow Department of Chemistry and Chemical Biology Harvard University, Cambridge, MA 02138, USA
2007-2012	Graduate Research Assistant Department of Chemistry Massachusetts Institute of Technology, Cambridge, MA 02139, USA
2005-2007	Undergraduate Research Assistant College of Chemistry and Molecular Engineering, Peking University, China

HONORS AND AWARDS

2023	Life Chemistry Young Investigator Award, Chinese Chemistry Society
2020	Bayer Investigator Award, Peking University
2020	Teaching Excellence Award, Peking University
2020	OKeanos-CAPA Young Investigator Award at the Chemical and Biology interface, CAPA
2019	Luye Eminent Young Scholar Fellowship, Peking University
2019	C&EN's Talented 12 Award, American Chemical Society
2019	Oral Presentation Award, Chinese Society of Biochemistry and Molecular Biology
2016	CNHUPO Young Investigator Presentation Award, China Human Proteome Organization
2011	CSHA Fellowship, Cold Spring Harbor Laboratory Asia
2008	Lewis Paul Chapin Fellowship, MIT
2008	Department of Chemistry Outstanding Teaching Award, MIT
2005	President's Undergraduate Research Fellowship, Peking University
2005	Wu Si Scholarship, Peking University
2004	Xiang Lu Scholarship, Peking University
2003	Freshman Scholarship, Peking University
2003	Gold medalist, Chinese Chemistry Olympiad
2003	Silver medalist, Chinese Mathematics Olympiad

RESEARCH GRANTS

On-going:

2022-2027	Proteomic discovery and functional studies of novel protein post-translational modifications, Ministry of Science and Technology of China (2022YFA1304700), RMB 2,825,900, co-PI.
2021-2025	System-oriented Research on Multidimensions of the Proteome, National Natural Science Foundation of China (32088101), RMB 6,000,000, co-PI.
2018-2023	Chemical labeling and functional manipulations of protein glycosylation, Ministry of Science and Technology of China (2018YFA0507600), RMB 2,400,000, co-PI.

Completed:

2018-2022	An optical-electrical integrated bioimaging system with ultrahigh spatial and temporal resolutions, National Natural Science Foundation of China (21727806), RMB 900,000, co-PI.
2017-2022	Study of centromere protein machinery and the molecular mechanism of cell fate determination, Ministry of Science and Technology of China (2017YFA0503600), RMB 2,400,000, co-PI.
2018-2020	Protein labeling technique for profiling nascent synaptic proteome, Beijing Municipal Natural Science Foundation (5182011), RMB 200,000, PI.
2018-2020	Spatiotemporally-resolved detection of protein lipidation, National Natural Science

Foundation of China (91753131), RMB 700,000, PI.

2017-2020   Development of fluorescent voltage sensors and their application in the mechanistic study of neuronal signaling, National Natural Science Foundation of China (21673009), RMB 680,000, PI.

PROFESSIONAL SOCIETY AFFILIATIONS

Membership
2023-now   Member, Chinese Neuroscience Society
2020-now   Member, Chinese-American Chemistry and Chemical Biology Professors Association
2017-now   Member, Biophysical Society of China
2014-now   Member, Chinese Chemical Society
2007-now   Member, American Chemical Society

Editorial activities
2023-now   Editorial Advisory Board Member, ACS Bio & Med Chem Au
2023-now   Topic Editor, Bioconjugate Chemistry
2022-now   Editorial Advisory Board Member, Biochemistry
2019-now   Deputy Editor, University Chemistry
2017-2022   Editorial Board, Chinese Chemical Letters

NATIONAL AND INTERNATIONAL MEETING ORGANIZERS AND SESSION CHAIRS

2022/12   Symposium for Structural Biology and Proteomics, Online, Session Chair
2020/01   PKU-UCSD Bilateral Symposium, La Jolla, CA, USA, Session Chair
2019/10   2019 PKU-SFBC Symposium, Beijing, China, Session Chair
2018/12   HKU Chemical Biology Symposium, Hong Kong, China, Session Chair
2018/08   The 5th Asian Chemical Biology Conference, Xi'an, China, Session Chair
2014/09   Symposium on Fluorescent Proteins and Biological Sensors, HHMI Janelia Farm Research Campus, Virginia, USA, Session Chair

TEACHING ACTIVITIES

2019-now   Chemical Biology Labs, undergraduate level, 60 hrs/yr
2019-now   Integrated Science Laboratory III, undergraduate level, 24 hrs/yr
2017-now   Fundamentals of Life Chemistry, undergraduate level, 48 hrs/yr
2016-now   PTN Chemical Biology Module, graduate level, 2 hrs/yr
2015-now   PTN Neurobiology Module, graduate level, 2 hrs/yr
2017-2020   Chemistry Today, undergraduate level, 16 hrs/yr
2019-2019   PTN Synthetic Biology Module, graduate level, 4 hrs/yr

RESEARCH SUMMARY

Research in my group can be broadly defined as creating novel chemical tools to study cell functions at high spatio-temporal resolution and with high throughput, particularly in neurons. Neural functions arise through the complex interactions between biological macromolecules, physical forces (e.g. membrane voltage), and chemical signaling (e.g. metabolites). To study cells at these three levels, we develop chemical labeling methods, fluorescent indicators, photoaffinity probes, and integrate these tools with advanced sequencing, proteomics, and imaging techniques.

- **Profiling subcellular transcriptome and proteome with proximity labeling techniques**

    In eukaryotic cells, RNAs and proteins are often segregated into subcellular compartments, with their localizations intimately linked to their functions. Yet efforts to investigate the spatial organization of transcriptome and proteome have been hindered by a lack of analytical tools. To address this challenge, my group has developed proximity labeling techniques to conjugate RNAs and proteins with affinity tags in live cells. One of our technique, called CAP-seq, utilizes a genetically-encoded photosensitizer to mediate the proximity-dependent photo-oxidation of RNA molecules, which are subsequently purified and sequenced. Our CAP-seq data have revealed a model of coordinated mitochondrial protein biogenesis via localized translation.

- **Optical recording of neural activity with engineered fluorescent voltage indicators**

    Membrane potential is a fundamental biophysical signal that underlies neural activity. Fluorescent neural activity indicators could complement conventional electrode-based recording by offering high spatial resolution, minimal invasiveness, and highly parallel measurement. My group has contributed to this field by designing and developing hybrid voltage indicators that feature protein-dye conjugate structures. Our method is built upon the site-specific modification of voltage-sensing microbial rhodopsin protein with organic dyes, whose fluorescence is tuned by membrane voltage fluctuations via the electrochromic FRET mechanism. By combining the superior photophysics of organic fluorophores with the genetic targeting of protein scaffold, these hybrid voltage indicators offer both an enhanced sensitivity and a red-shifted spectrum over existing fluorescent protein-based indicators, enabling the all-optical investigation of neuronal electrophysiology.

- **Profiling genomic targets of ROS signaling**

    Reactive oxygen species (ROS) have recently emerged as signaling molecules in mammalian cells, including neurons. ROS reacts with DNA to form 8-oxoG as the major product, which is closely associated with neurodegeneration. Genomic profiling of 8-oxoG could help elucidate its function in ROS signaling, but unfortunately, commercially available antibodies towards 8-oxoG are plagued with poor specificity and low binding affinity. My group addressed this challenge by engineering DNA repair enzymes. Through structure-guided mutagenesis, the lyase activity of glycosylase OGG1 is blocked while retaining its ability to recognize 8-oxoG. Its high affinity and target specificity have enabled the identification of >1000 8-oxoG-rich "hot zones" in mouse embryonic fibroblast genome, particularly in CpG islands and in regulatory elements, revealing that guanine oxidation is more likely to accumulate in accessible and transcriptionally active chromatin regions.

PUBLICATIONS

PKU publications (# co-first author; * corresponding author)

1. Han, Y.#, Yang, J.#,*, Li, Y.#, Chen, Y.#, Ren, H., Ding, R., Qian, W., Ren, K., Xie, B., Deng, M., Xiao, Y., Chu, J. and **Zou, P.*** (2023). Bright and sensitive red voltage indicators for imaging action potentials in brain slices and pancreatic islets. *Sci. Adv.* **under revision**.

2. Zhang, W., Fu, Y., Peng, L., Ogawa, Y., Zhou, X., Rasband M. N. and **Zou, P.*** (2023). Spatially resolved proteomic profiling uncovers structural and functional regulators of the axon initial segment. *Nat. Commun.* **under revision**.

3. Ma, R., Peng, L., Bi, X., Liu, S. and **Zou, P.*** (2023). Genetically encoded voltage indicators for reversibly mapping mitochondrial membrane potential dynamics. *Proc. Natl. Acad. Sci. U. S. A.* **under revision**.

4. Yuan, F., Li, Y., Zhou, X. and **Zou, P.*** (2023). Spatially resolved mapping of proteome turnover dynamics with subcellular precision. *Nat. Commun.* **accepted in principle**.

5. Ren, Z.#, Tang, W.#, Peng, L. and **Zou, P.*** (2023). Profiling stress-triggered RNA condensation with photocatalytic proximity labeling. *Nat. Commun.* **accepted in principle**.

6. Peng, L. and **Zou, P.*** (2023). Supertemporal resolution imaging of membrane potential via stroboscopic microscopy. *Chem. Biomed. Imaging* **1**, 448–460.

7. Liu, S.#, Ling, J.#, Chen, P., Cao, C., Peng, L., Zhang, Y., Ji, G., Guo, Y., Chen, P. R., **Zou, P.*** and Chen, Z.* (2023). Orange/far-red hybrid voltage indicators with reduced phototoxicity enable reliable long-term imaging in neurons and cardiomyocytes. *Proc. Natl. Acad. Sci. U. S. A.* **120**, e2306950120.

8. Lin, C., Liu, L. and **Zou, P.*** (2023). Functional imaging-guided cell selection for evolving genetically encoded fluorescent indicators. *Cell Rep. Methods* **3**, 100544.

9. Ren, Z.#, Li, R.#, Zhou, X.#, Chen, Y., Fang, Y. and **Zou, P.*** (2023). Enzyme-mediated proximity labeling identifies small RNAs in the endoplasmic reticulum lumen. *Biochemistry* **62**, 1844-1848.

10. Zheng, F., Yu, C., Zhou, X. and **Zou, P.*** (2023). Genetically encoded photocatalytic protein labeling enables spatially-resolved profiling of intracellular proteome. *Nat. Commun.* **14**, 2978.

11. Fang, Y. and **Zou, P.*** (2023). Photocatalytic proximity labeling for profiling the subcellular organization of biomolecules. *Chembiochem.* **24**, e202200745.

12. Li, R. and **Zou, P.*** (2023). MERR APEX-seq protocol for profiling subcellular nascent transcriptome in mammalian cells. *STAR Protoc.* **4**, 102057.

13. Wang, R. and **Zou, P.*** (2023). Bioorthogonal chemical ligation creates synthetic antibodies with improved therapeutic potency. *ACS Cent. Sci.* **9**, 349-351.

14. Bernardes, G. J. L., **Zou, P.**, Dai, Z., Lavik, E., van Hest, J., Zheng, G., Quinn, N., MacLaughlin, C. M., Reineke, T. M.* (2023). Introducing the 2023 Bioconjugate Chemistry Editorial Team. *Bioconjugate Chem.* **34**, 279–282.

15. Yang, X., Chen, D., Sun, Q., Wang, Y., Xia, Y., Yang, J., Lin, C., Dang, X., Cen, Z., Liang, D., Wei, R., Xu, Z., Xi, G., Xue, G., Ye, C., Wang, L.-P., **Zou, P.**, Wang, S., Rivera-Fuentes, P., Püntener, S., Chen, Z., Liu, Y.*, Zhang, J.* and Zhao, Y.* (2023). A live-cell image-based machine learning strategy for reducing variability in PSC differentiation systems. *Cell Discov.* **9**, 53.

16. Li, R., Zou, Z., Wang, W. and **Zou, P.*** (2022). Metabolic incorporation of electron-rich ribonucleosides enhanced APEX-seq for profiling spatially restricted nascent transcriptome. *Cell Chem. Biol.* **29**, 1218-1231.e8.

17. Luo, H.[#], Tang, W.[#], Liu, H., Zeng, X., Ngai, W. S. C., Gao, R., Li, H., Li, R., Zheng, H., Guo, J., Qin, F., Wang, G., Li, K., Fan, X.*, **Zou, P.*** and Chen, P. R.* (2022). Photo-catalytic chemical crosslinking for profiling RNA-protein interactions in living cells. *Angew. Chem. Int. Ed. Engl.* **61**, e202202008.

18. Xie, B.[#], Pu, Y.[#], Yang, F., Chen, W., Yue, W., Ma, J., Zhang, N., Jiang, Y., Wu, J., Lin, Y., Liang, X., Wang, W., **Zou, P.*** and Li, M.* (2022). Mapping and targeting proteome of mitotic pericentriolar material for killing tumors bearing centrosome amplification. *Cancer Res.* **82**, 2576-2592.

19. Sun, M., Yuan, F., Tang, Y., **Zou, P.*** and Lei, X.* (2022). Subcellular interactomes revealed by merging APEX with cross-linking mass spectrometry. *Anal. Chem.* **94**, 14878-14888.

20. Chen, Z., Peng, L., Zhao, M., Tao, L.*, **Zou, P.*** and Zhang, Y.* (2022). Differences in Action Potential Propagation Velocity and Axon Initial Segment Plasticity in Neurons from Sprague Dawley Rats and C57BL/6 Mice. *Zool. Res.* **43**, 615-633.

21. Tian, W., Peng, L., Zhao, M., Tao, L.*, **Zou, P.*** and Zhang, Y.* (2022). Dendritic morphology affects the velocity and amplitude of backpropagating action potentials. *Neurosci. Bull.* **in press.** DOI: 10.1007/s12264-022-00931-9

22. Lv, P.[#], Du, Y.[#], He, C.[#], Peng, L., Zhou, X., Wan, Y., Zeng, M., Zhou, W., **Zou, P.**, Li, C., Zhang, M., Dong, S.* and Chen, X.* (2022). O-GlcNAcylation modulates liquid-liquid phase separation of SynGAP/PSD-95. *Nat. Chem.* **14**, 831-840.

23. An, Y., Zhao, Q.*, Gong, Z., Zhao, L., Li, Y., Liang, Z., **Zou, P.**, Zhang, Y. and Zhang, L.* (2022). Suborganelle-specific protein complex analysis enabled by in vivo cross-linking coupled with proximal labeling. *Anal. Chem.* **94**, 12051-12059.

24. Sedzro, D.M., Yuan, X., Mullen, M., Ejaz, U., Yang, T., Liu, X., Song, X., Tang, Y.-C., Pan, W., **Zou, P.**, Gao, X., Wang, D., Wang, Z., Dou, Z.*, Liu, X.* and Yao, X.* (2022). Phosphorylation of CENP-R by Aurora B regulates kinetochore-microtubule attachment for accurate chromosome segregation. *J. Mol. Cell Biol.* **14**, mjac051.

25. Liu, S.[#], Lin, C.[#], Xu, Y.[#], Luo, H., Peng, L., Zeng, X., Zheng, H., Chen, P. R.* and **Zou, P.*** (2021). A far-red hybrid voltage indicator enabled by bioorthogonal engineering of rhodopsin on live neurons. *Nat. Chem.* **13**, 472-479.

26. Zhou, Y. and **Zou, P.*** (2021). The evolving capabilities of enzyme-mediated proximity labeling. *Curr. Opin. Chem. Biol.* **60**, 30-38.

27. Liu, Y.[#], Zeng, R.[#], Wang, R., Weng, Y., Wang, R., **Zou, P.*** and Chen, P. R.* (2021). Spatiotemporally resolved subcellular phosphoproteomics. *Proc. Natl. Acad. Sci. U. S. A.* **118.** e2025299118

28. Liu, S.[#], Yang, J.[#] and **Zou, P.*** (2021). Bringing together the best of chemistry and biology: hybrid indicators for imaging neuronal membrane potential. *J. Neurosci. Methods* **363**, 109348.

29. Ke, M., Yuan, X., He, A., Yu, P., Chen, W., Shi, Y., Hunter, T., **Zou, P.** and Tian, R.* (2021). Spatiotemporal profiling of cytosolic signaling complexes in living cells by selective proximity proteomics. *Nat. Commun*. **12**, 71.

30. Wang, S., Lin, C.-W., Carleton, A. E., Cortez, C. L., Johnson, C., Taniguchi, L. E., Sekulovski, N., Townshend, R. F., Basrur, V., Nesvizhskii, A. I., **Zou, P.**, Fu, J.*, Gumucio, D. L.*, Duncan, M. C.* and Taniguchi, K.* (2021). Spatially resolved cell polarity proteomics of a human epiblast model. *Sci. Adv*. **7,** eabd8407.

31. Chen, L., Li, N., Zhang, M., Sun, M., Bian, J., Yang, B., Li, Z., Wang, J., Li, F., Shi, X., Wang, Y., Yuan, F., **Zou, P.**, Shan, C. and Wang, J.* (2021) APEX2-based proximity labeling of Atox1 identifies CRIP2 as a nuclear copper-binding protein that regulates autophagy activation. *Angew. Chem. Int. Ed. Engl.* **60**, 25346-25355.

32. Xie, B., Liang, X., Yue, W., Ma, J., Li, X., Zhang, N., Wang, P., Liu, C., Shi, X., Qiao, J., **Zou, P.** and Li, M.* (2021). Targeting cytokinesis bridge proteins to kill high-CIN type tumors. *Fundamental Research* **1**, 752-766.

33. Xu, F., Du, W., Zou, Q., Wang, Y., Zhang, X., Xing, X., Li, Y., Zhang, D., Wang, H., Zhang, W., Hu, X., Liu, X., Liu, X., Zhang, S., Yu, J., Fang, J., Li, F., Zhou, Y., Yue, T., Mi, N., Deng, H., **Zou, P.**, Chen, X., Yang, X.* and Yu, L.* (2021). COPII mitigates ER stress by promoting formation of ER whorls. *Cell Res.* **31**, 141-156.

34. Li, Y., Yuan, Y., Li, Y., Han, D., Liu, T., Yang, N., Mi, X., Hong, J., Liu, K., Song, Y., He, J., Zhou, Y., Han, Y., Shi, C., Yu, S., **Zou, P.**, Guo, X.* and Li, Z.* (2021). Inhibition of α-synuclein accumulation improves neuronal apoptosis and delayed postoperative cognitive recovery in aged mice. *Oxid. Med. Cell Longev.* **2021**, 5572899.

35. Ding, T.[#], Zhu, L.[#], Fang, Y., Liu, Y., Tang, W. and **Zou, P.*** (2020). Chromophore-assisted proximity labeling of DNA reveals chromosomal organization in living cells. *Angew. Chem. Int. Ed. Engl.* **59**, 22933-22937.

36. Li, Y., Tian, C., Liu, K., Zhou, Y., Yang, J.* and **Zou, P.*** (2020). A clickable APEX probe for proximity-dependent proteomic profiling in yeast. *Cell Chem. Biol.* **27**, 858-865.

37. Fang, Y. and **Zou, P.*** (2020). Genome-wide mapping of oxidative DNA damage via engineering of 8-oxoguanine DNA glycosylase. *Biochemistry* **59**, 85-89.

38. Li, Y., Liu, K., Zhou, Y., Yang, J.* and **Zou, P.*** (2020). Protocol for proximity-dependent proteomic profiling in yeast cells by APEX and Alk-Ph probe. *STAR Protoc.* **1**, 100137.

39. Yuan, Y.[#], Li, Z.[#], Yang, N.[#], Han, Y., Ji, X., Han, D., Wang, X., Li, Y., Liu, T., Yuan, F., He, J., Liu, Y., Ni, C., **Zou, P.**, Wang, G.*, Guo, X.* and Zhou, Y.* (2020). Exosome alpha-synuclein release in plasma may be associated with postoperative delirium in hip fracture patients. *Front Aging Neurosci.* **12**, 67.

40. Wang, P.[#], Tang, W.[#], Li, Z.[#], Zou, Z., Zhou, Y., Li, R., Xiong, T., Wang, J.* and **Zou, P.*** (2019). Mapping spatial transcriptome with light-activated proximity-dependent RNA labeling. *Nat. Chem. Biol.* **15**, 1110-1119.

41. Zhou, Y.[#], Wang, G.[#], Wang, P., Li, Z., Yue, T., Wang, J. and **Zou, P.*** (2019). Expanding APEX2 substrates for proximity-dependent labeling of nucleic acids and proteins in living cells. *Angew. Chem. Int. Ed. Engl.* **58**, 11763-11767.

42. Xu, Y.[#], Deng, M.[#], Zhang, S.[#], Yang, J.[#], Peng, L., Chu, J.* and **Zou, P.*** (2019). Imaging neuronal activity with fast and sensitive red-shifted electrochromic FRET indicators. *ACS Chem. Neurosci.* **10**, 4768-4775.

43. Wang, C., **Zou, P.**, Yang, C., Liu, L., Cheng, L., He, X., Zhang, L., Zhang, Y., Jiang, H.* and Chen, P.R.* (2019). Dynamic modifications of biomacromolecules: mechanism and chemical interventions. *Sci. China Life Sci.* **62**, 1459-1471.

44. Yu, H., Zhao, T., Liu, S., Wu, Q., Johnson, O., Wu, Z., Zhuang, Z., Shi, Y., Peng, L., He, R., Yang, Y., Sun, J., Wang, X., Xu, H., Zeng, Z., **Zou, P.**, Lei, X., Luo, W.* and Li, Y.* (2019). MRGPRX4 is a bile acid receptor for human cholestatic itch. *Elife* **8**, e48431.

45. Zhou, Y.[#], Zhu, L.[#] and **Zou P.*** (2019). A brief introduction to Nobel Prize in Chemistry 2018: harnessing the power of evolution. *Univ. Chem.* **34**, 1-6.

46. Xu, Y.[#], Peng, L.[#], Wang, S.[#], Wang, A.[#], Ma, R., Zhou, Y., Yang, J., Sun, D. E., Lin, W., Chen, X. and **Zou, P.*** (2018). Hybrid indicators for fast and sensitive voltage imaging. *Angew. Chem. Int. Ed. Engl.* **57**, 3949-3953.

47. Wang, A.[#], Feng, J.[#], Li, Y.* and **Zou, P.*** (2018). Beyond fluorescent proteins: hybrid and bioluminescent indicators for imaging neural activities. *ACS Chem. Neurosci.* **9**, 639-650.

48. Kiskinis, E.[#], Kralj, J. M.[#], **Zou, P.**[#], Weinstein, E. N.[#], Zhang, H., Tsioras, K., Wiskow, O., Ortega, J. A., Eggan, K.* and Cohen, A. E.* (2018). All-optical electrophysiology for high-throughput functional characterization of a human iPSC-derived motor neuron model of ALS. *Stem Cell Reports* **10**, 1991-2004.

49. Park, K., Kuo, Y., Shvadchak, V., Ingargiola, A., Dai, X., Hsiung, L., Kim, W., Zhou, H., **Zou, P.**, Levine, A. J., Li, J. and Weiss, S.* (2018). Membrane insertion of-and membrane potential sensing by-semiconductor voltage nanosensors: Feasibility demonstration. *Sci. Adv.* **4**, e1601453.

50. Xu, Y., **Zou, P.*** and Cohen, A. E.* (2017). Voltage imaging with genetically encoded indicators. *Curr. Opin. Chem. Biol.* **39**, 1-10.

51. Peng, L.[#], Xu, Y.[#] and **Zou, P.*** (2017). Genetically-encoded voltage indicators. *Chin. Chem. Lett.* **28**, 1925-1928.

52. Abdelfattah, A. S., Farhi, S. L., Zhao, Y. X., Brinks, D., **Zou, P.**, Ruangkittisakul, A., Platisa, J., Pieribone, V. A., Ballanyi, K., Cohen, A. E. and Campbell, R. E.* (2016). A bright and fast red fluorescent protein voltage indicator that reports neuronal activity in organotypic brain slices. *J. Neurosci.* **36**, 2458-2472.

Prior to PKU (# co-first author; * corresponding author)
53. **Zou, P.**[#], Zhao, Y.[#], Douglass, A. D., Hochbaum, D. R., Brinks, D., Werley, C. A., Harrison, D. J., Campbell, R. E.* and Cohen, A. E.* (2014). Bright and fast multicoloured voltage reporters via electrochromic FRET. *Nat. Commun.* **5**, 4625.

54. Hung, V., **Zou, P.**, Rhee, H. W., Udeshi, N. D., Cracan, V., Svinkina, T., Carr, S. A., Mootha, V. K. and Ting, A. Y.* (2014). Proteomic mapping of the human mitochondrial intermembrane space in live cells via ratiometric APEX tagging. *Mol. Cell* **55**, 332-341.

55. Hochbaum, D. R.[#], Zhao, Y.[#], Farhi, S. L., Klapoetke, N., Werley, C. A., Kapoor, V., **Zou, P.**, Kralj, J. M., Maclaurin, D., Smedemark-Margulies, N., Saulnier, J. L., Boulting, G. L., Straub, C., Cho, Y. K., Melkonian, M., Wong, G. K. S., Harrison, D. J., Murthy, V. N., Sabatini, B. L., Boyden, E. S.,

Campbell, R. E. and Cohen, A. E.* (2014). All-optical electrophysiology in mammalian neurons using engineered microbial rhodopsins. *Nat. Methods* **11**, 825-833.

56. Rhee, H. W.[#], **Zou, P.[#]**, Udeshi, N. D., Martell, J. D., Mootha, V. K., Carr, S. A. and Ting, A. Y.* (2013). Proteomic mapping of mitochondria in living cells via spatially restricted enzymatic tagging. *Science* **339**, 1328-1331.

57. Scotti, E., Calamai, M., Goulbourne, C. N., Zhang, L., Hong, C., Lin, R. R., Choi, J., Pilch, P. F., Fong, L. G., **Zou, P.**, Ting, A. Y., Pavone, F. S., Young, S. G. and Tontonoz, P.* (2013). IDOL stimulates clathrin-independent endocytosis and multivesicular body-mediated lysosomal degradation of the low-density lipoprotein receptor. *Mol. Cell Biol.* **33**, 1503-1514.

58. Kang, X., Zhong, N., **Zou, P.**, Zhang, S. N., Jin, C. W. and Xia, B.* (2012). Foldon unfolding mediates the interconversion between M-pro-C monomer and 3D domain-swapped dimer. *Proc. Natl. Acad. Sci. U. S. A.* **109**, 14900-14905.

59. Cohen, J. D., **Zou, P.** and Ting, A. Y.* (2012). Site-specific protein modification using lipoic acid ligase and bis-aryl hydrazone formation. *Chembiochem* **13**, 888-894.

60. **Zou, P.** and Ting, A. Y.* (2011). Imaging LDL receptor oligomerization during endocytosis using a co-internalization assay. *ACS Chem. Biol.* **6**, 308-313.

61. Prince, R. N., Schreiter, E. R., **Zou, P.**, Wiley, H. S., Ting, A. Y., Lee, R. T. and Lauffenburger, D. A.* (2010). The heparin-binding domain of HB-EGF mediates localization to sites of cell-cell contact and prevents HB-EGF proteolytic release. *J. Cell Sci.* **123**, 2308-2318.

62. Zhong, N.[#], Zhang, S. N.[#], Xue, F.[#], Kang, X., **Zou, P.**, Chen, J. X., Liang, C., Rao, Z. H., Jin, C. W., Lou, Z. Y.* and Xia, B.* (2009). C-terminal domain of SARS-CoV main protease can form a 3D domain-swapped dimer. *Protein Sci.* **18**, 839-844.

63. Zhong, N., Zhang, S. N., **Zou, P.**, Chen, J. X., Kang, X., Li, Z., Liang, C., Jin, C. W. and Xia, B.* (2008). Without its N-finger, the main protease of severe acute respiratory syndrome coronavirus can form a novel dimer through its C-terminal domain. *J. Virol.* **82**, 4227-4234.

Patents

1. US20140186870, "In vivo proteomics," Alice Y. Ting, Jeffrey Daniel Martell, Hyun-Woo Rhee, **Peng Zou**, July 2014.

2. US20150369740, "Optogenetic probes for measuring membrane potential," Adam E. Cohen, Daniel Hochbaum, **Peng Zou**, Samouil Leon Farhi, Robert Earl Campbell, Yongxin Zhao, Daniel Jed Harrison, Dec. 2015.

INVITED TALKS AND CONFERENCE PRESENTATIONS

1. Spatially resolved proteomic profiling via immuno- and photocatalytic proximity labeling, the 12th CNHUPO Annual Congress (2023/09, Invited Speaker), Chengdu

2. Genetically encoded photocatalysis for spatially restricted profiling of biomolecules, the 1st SZBL Chemical Biology Symposium (2023/09, Invited Speaker), Shenzhen

3. Genetically Encoded Photocatalysis for Spatially Restricted Profiling of Biomolecules, the 6th Asian Chemical Biology Conference (2023/08, Invited Speaker), Jeju, Korea

4. Voltage imaging with hybrid indicators enabled by the bioorthogonal engineering of rhodopsin, American Chemical Society Fall Meeting 2023 (2023/08, Invited Speaker), San Francisco, CA, USA

5. Spatiotemporally resolved multi-omics, the 33rd Chinese Chemical Society Conference (2023/06, Invited Speaker), Qingdao

6. Genetically Encoded Photocatalytic Protein Labeling Enables Spatially-Resolved Profiling of Intracellular Proteome, Bioorganic Chemistry Gordon Research Conference (2023/06, Invited Speaker), Andover, NH, USA

7. Photocatalytic proximity labeling resolves the mechanism of membraneless organelle assembly, the 3rd National Symposium of Biological Phase Separation and Phase Transition (2023/06, Invited Speaker), Shanghai

8. Spatiotemporally resolved multi-omics, Southern University of Science and Technology (2023/05, Invited Speaker), Shenzhen

9. Photocatalytic proximity labeling resolves the mechanism of membraneless organelle assembly, Shenzhen Bay Laboratory (2023/05, Invited Speaker), Shenzhen

10. Imaging membrane potential with genetically encoded indicators, Hong Kong University of Science and Technology (2023/04, Invited Speaker), Hong Kong

11. Spatiotemporally resolved omics, the 12th Chinese National Conference on Chemical Biology (2023/04, Invited Speaker), Dalian

12. Spatiotemporally resolved subcellular transcriptomic labeling, the 2023 Annual Meeting of Chinese Society for Cell Biology (2023/04, Invited Speaker, Session Chair), Suzhou

13. Bright and sensitive red voltage indicators for imaging neuronal action potentials, the 6th International Symposium of Synaptic Transmission and Neural Plasticity (2023/04, Invited Speaker), Shenzhen

14. Molecular probes for neural activities, Young Investigator Symposium for Chemical Biology (2023/02, Invited Speaker), Online

15. Photocatalytic proximity labeling of subcellular proteomes, Symposium for Structural Biology and Proteomics (2022/12, Invited Speaker, Session Chair), Online

16. Chemical probes for neuroscience, Chongqing University (2022/11, Invited Speaker), Online

17. Bioorthogonal chemistry, Institute of Pathogen Biology, CAMS (2022/10, Invited Speaker), Online

18. Hybrid voltage indicators for mapping neuronal action potentials, Neuro Zoom Research Talks (2022/09, Invited Speaker), Online

19. Mapping stress granule transcriptome with photocatalytic RNA proximity labeling, Interdisciplinary Research Center on Biology and Chemistry, CAS (2022/08, Invited Speaker), Online

20. Imaging neuronal electrophysiology with hybrid voltage indicators, 19th Chinese-American Kavli Frontiers of Science - Hybrid Virtual Symposium (2022/07, Invited Speaker), Online

21. Spatiotemporally resolved subcellular omics, Shanghai Jiao Tong University (2022/05, Invited Speaker), Online

22. Hybrid voltage indicators for imaging neuronal activities, NSFC-RGC Young Scholar Forum (2021/12, Invited Speaker), Online

23. Chemical probes for neuroscience, Nanjing Normal University (2021/12, Invited Speaker), Online

24. Hybrid neuronal fluorescent sensors enabled by bioorthogonal protein engineering, Pacifichem 2021 (2021/12, Invited Speaker), Online

25. Spatiotemporally resolved proteomics and transcriptomics, Jizhitongxing V Symposium (2021/05, Invited Speaker), Chongqing
26. Hybrid indicators for all-optical mapping of neuronal electrophysiology, Beihang University (2021/05, Invited Speaker), Beijing
27. Chemical probes for neuroscience, the 32nd Chinese Chemical Society Conference (2021/04, Invited Speaker), Zhuhai
28. Hybrid voltage indicators for imaging neuronal activities, ACS 2021 Spring Meeting (2021/04, Invited Speaker), Online
29. Chemical probes for neuroscience, China Brain Science and Technology Conference (2020/12, Invited Speaker), Tianjin (online)
30. Chemical probes for neuroscience, Institute of Automation, CAS (2020/11, Invited Speaker), Beijing
31. Chemical probes for neuroscience, SFBC-ChemBIC Bilateral Symposium (2020/11, Invited Speaker), Beijing
32. Spatiotemporally resolved subcellular transcriptomic profiling CAP-seq, Beijing National Laboratory of Molecular Sciences Symposium (2020/10, Invited Speaker), Beijing
33. Profiling subcellular transcriptome with chromophore-assisted proximity-labeling and sequencing (CAP-seq), Bayer 2020 Online Symposium (2020/08, Invited Speaker), Beijing (online)
34. Mapping spatial transcriptome with chromophore-assisted proximity-dependent RNA labeling, PKU-UChicago Joint Series Symposium on the Intersection of Chemistry and Biology (2020/07, Invited Speaker), Beijing (online)
35. Recent developments in neuronal voltage imaging, ION Seminar Series (2020/06, Invited Speaker), Shanghai (online)
36. Profiling subcellular transcriptome with proximity-dependent RNA labeling, PKU-UCSD Bilateral Symposium (2020/01, Invited Speaker, Session Chair), La Jolla, CA, USA
37. Profiling subcellular transcriptome with proximity-dependent RNA labeling, The Scripps Research Institute (2020/01, Invited Speaker), La Jolla, CA, USA
38. Mapping spatial transcriptome with proximity RNA labeling, The IUPAC International Symposium on Bioorganic Chemistry (ISBOC-12) (2019/12, Invited Speaker), Shenzhen
39. Chromophore-assisted proximity labeling for profiling subcellular transcriptome, The 11th Chinese National Conference on Chemical Biology (2019/11, Invited Speaker), Guangzhou
40. Light-activated proximity labeling of RNA and DNA, The 4th A3 Roundtable Meeting on Chemical Probe Research Hub (2019/11, Invited Speaker), Sendai, Japan
41. Spatially resolved transcriptomic profiling, School of Pharmacy, PKU Medical School (2019/11, Invited Speaker), Beijing
42. Spatially restricted RNA labeling for subcellular transcriptomic analysis, The Chinese Society of Biochemistry and Molecular Biology Annual Meeting (2019/10, Oral Presentation), Taiyuan
43. Light-activated spatial-specific RNA labeling (CAP-seq) reveals organization of subcellular transcriptome, 2019 PKU-SFBC Symposium (2019/10, Invited Speaker, Session Chair), Beijing
44. Hybrid voltage indicators for imaging neuronal activities, Korea Institute of Science and Technology (2019/08, Invited Speaker), Seoul, Korea

45. Mapping spatial transcriptome with light-activated proximity-dependent RNA labeling, Seoul National University (2019/08, Invited Speaker), Seoul, Korea

46. Spatial-specific transcriptome profiling with light-activated proximity labeling, Ajou University (2019/08, Invited Speaker), Suwon, Korea

47. Photosensitized RNA proximity labeling technique, The 1st National RNA Research Conference (Junior) (2019/05, Oral Presentation), Beijing

48. Chemical tools for profiling spatially resolve omics, Dalian Institute of Chemical Physics, CAS (2019/05, Invited Speaker), Dalian

49. Spatial transcriptomic profiling with light-activated proximity labeling, POSTECH-IBS-PKU Conference for Chemical Biology and Biomaterial (2019/04, Invited Speaker), Pohang, Korea

50. Next-generation fluorescent voltage indicators, The 3rd Fluorescent Probe and Imaging Symposium (2019/04, Invited Speaker), Xi'an

51. Mapping spatial transcriptome with light-activated proximity-dependent RNA labeling (CAP-seq), Hokkaido University & Peking University Joint Symposium (2019/01, Invited Speaker), Sapporo, Japan

52. Mapping spatial transcriptome via chromophore-assisted proximity tagging (CAPtag), HKU Chemical Biology Symposium 2018 (2018/12, Invited Speaker, Session Chair), Hong Kong

53. Beyond fluorescent proteins: hybrid voltage indicators for voltage imaging, National Institute of Biological Sciences (2018/12, Invited Speaker), Beijing

54. Beyond fluorescent proteins: hybrid voltage indicators for imaging bioelectricity, ACS Publication Symposium (2018/12, Oral Presentation), Beijing

55. Profiling subcellular transcriptome via proximity tagging techniques, The 3rd A3 Roundtable Meeting on Chemical Probe Research Hub (2018/11, Invited Speaker), Jeju, Korea

56. Profiling subcellular transcriptome via Chromophore-assisted proximity tagging (CAP-tag), The 5th Asian Chemical Biology Conference (2018/08, Oral Presentation, Session Chair), Xi'an

57. Hybrid voltage indicators, The 5th National Conference of Biophysical Chemistry (2018/07, Oral Presentation), Taiyuan

58. Spatially specific RNA profiling via chromophore-assisted proximity tagging (CAP-tag), The 31st Chinese Chemical Society Conference (2018/05, Oral Presentation), Hangzhou

59. Hybrid Voltage Indicators for Mapping Neural Activity, PKU-UC Davis Bilateral Symposium (2018/05, Invited Speaker), Beijing

60. Chemical probes for neuroscience, Academy of Military Medical Sciences (2018/01, Invited Speaker), Beijing

61. Chemical Probes for Neural Activities, The 15th Chinese Biophysics Congress (2017/11, Invited Speaker), Shanghai

62. Chromophore-assisted Proximity Tagging of RNA, The 2nd A3 Roundtable Meeting on Chemical Probe Research Hub (2017/11, Invited Speaker), Hangzhou

63. Chemical probes for neuroscience, The 10th Chinese National Conference on Chemical Biology (2017/09, Invited Speaker), Wuhan

64. Voltage imaging with genetically-encoded indicators, The 2nd Biomedical Imaging Method Symposium (2017/08, Invited Speaker), Xi'an

65. Lighting up the brain with a flare, Institute of Microbiology, CAS (2017/05, Invited Speaker), Beijing
66. Lighting up the brain with a flare: a hybrid voltage indicator for optical mapping of neural activity, The 1st Peking University-Boehringer Ingelheim Joint Symposium on Biomedical Research (2017/05, Invited Speaker), Beijing
67. Imaging neuronal action potentials at high spatial and temporal resolutions, The 1st Fluorescent Probe and Imaging Symposium (2017/04, Invited Speaker), Dalian
68. Imaging neuronal signaling with genetically-encoded voltage indicators, HOPE meeting (2017/02, Oran Presentation), Tokyo, Japan
69. Enzyme-mediated proximity tagging for spatially mapping biomolecules, Symposium at Institute of Biological Chemistry, Academia Sinica (2016/11, Invited Speaker), Taiwan
70. Spatially resolved proteomic labeling technique, Chinese Society of Biochemistry and Molecular Biology Conference (2016/10, Oral Presentation), Hangzhou
71. APEX: spatially specific proteomic profiling, The 30th Chinese Chemical Society Conference (2016/07, Oral Presentation), Dalian
72. Genetically encoded voltage indicators based on electrochromic FRET, National Conference of Biophysical Chemistry (2016/06, Invited Speaker), Hefei
73. Mapping the subcellular proteome via APEX labeling, The 9th CNHUPO Conference (2016/05, Oral Presentation), Xiamen
74. Mapping the subcellular proteome via APEX labeling, Frontiers in Proteomics, National Center for Protein Sciences (2016/04, Invited Speaker), Beijing
75. Mapping the subcellular proteome via APEX labeling, PKU-HKU Joint Symposium on Chemical Biology (2016/04, Invited Speaker), Hongkong
76. Subcellular proteomic profiling techniques, Health Science Forum, Shanghai Institutes for Biological Sciences (2016/03, Invited Speaker), Shanghai
77. Fluorescent voltage indicators, The 2015 Annual Symposium for the Undergraduate Students of Bio-Liyun (ASUSBioLY) (2016/02, Invited Speaker), Beijing
78. Proteomic profiling of mitochondria, National Institute of Biological Sciences (2015/12, Invited Speaker), Beijing
79. Genetically-encoded voltage indicators based on electrochromic FRET, Cold Spring Harbor Asia Conference (2015/12, Oral Presentation), Suzhou
80. Spatially specific proteomic profiling techniques, The 5th Symposium of the Chinese Protein Society (2015/10, Invited Speaker), Jining
81. Chemical probes for neuroscience, PKU-Sun Yat-sen University Joint Symposium on Chemical Biology (2015/10, Invited Speaker), Guangzhou
82. Fluorescent voltage indicators, The 9th Chinese National Conference on Chemical Biology (2015/08, Invited Speaker), Tianjin
83. Bright and fast multi-colored voltage reporters via electrochromic FRET, Janelia Farm Research Campus, Howard Hughes Medical Institute (2014/09, Oral Presentation, Session Chair), Virginia, USA
84. Imaging neural activities with fluorescent voltage-indicating proteins, BIOPIC, Peking University (2014/02, Invited Speaker), Beijing

85. Enzyme-mediated promiscuous protein labeling method for mapping proteomes in living cells, Bioimaging Club, University of Michigan (2013/07, Invited Speaker), Ann Arbor, MI, USA