Zhuo Liu (Jude)

Name: Zhuo Liu
Address: Shanghai, China
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Education

Sep. 2015 – Jun. 2019	Ph. D. in Physics, Shanghai Jiao Tong University (SJTU), China Research area: Combining neutron scattering and molecular dynamics (MD) simulation to study protein dynamics Supervisor: Prof. Liang Hong
Sep. 2015 – Jun. 2019	Master in Inorganic Chemistry, Jilin University, China Research area: Synthesis and characterization of inorganic porous materials Supervisor: Prof. Jihong Yu
Sep. 2015 – Jun. 2019	Bachelor in Chemistry, Jilin University, China

Experience

Jan. 2022 – present **Research Scientist at Institute of Natural Sciences at SJTU**

Research area: Adaptation mechanism of deep-sea microbes to extreme environment;

Structural determination of mRNA lipid nanoparticles and its long-term preservation

Oct. 2019 – Oct. 2021 Tin Ka Ping Postdoctoral Fellow

at The Hong Kong University of Science and Technology (HKUST)

Research area: Studying heterogenous ice nucleation process by using MD simulation
Advisor: Prof. Xuhui Huang

Jul. 2012 – May 2015 Technical engineer at Tianjin Samsung Electro-Mechanics Co., Ltd., China

Research Grants

Oct. 2022 – Sep. 2024	PI, Shanghai Pujiang Talent Program, Amount: CNY 300,000 Study on high temperature adaptation mechanism of deep-sea microbes by using neutron and X-ray scattering
Jan. 2023 – Dec. 2025	PI, National Natural Science Foundation of China grant, Amount: CNY 300,000 Impact of lyophilization on the stability of mRNA lipid nanoparticles
Apr. 2023 – Mar. 2026	PI, Natural Science Foundation of Shanghai grant, Amount: CNY 200,000 Study on high temperature adaptation mechanism of deep-sea microorganisms based on evolutionary metabolic module
Jan. 2023 – Dec. 2024	PI, Oceanic Interdisciplinary Program of SJTU, Amount: CNY 500,000 Study on temperature adaptation mechanism of evolutionarily conserved modules in glycolysis metabolism of deep-sea microorganisms

Honors and Awards

2023	Shanghai overseas young talent
2022	Shanghai Pujiang Talent
2019 & 2020	Tin Ka Ping Postdoctoral Fellow at HKUST
2019	Shanghai Outstanding Graduates
2019	Outstanding doctoral thesis nomination award of SJTU
2018	GCL System Integration Scholarship at SJTU
2017	National Scholarship of China at SJTU

Oral Presentation

Apr. 2023	9th National Neutron Scattering Conference of China, Mianyang, China
Aug. 2022	2nd User Conference of High Energy Direct Inelastic Neutron Scattering Spectrometer at China Spallation Neutron Source, online, China
May 2019	Gordon Research Seminar-Neutron Scattering, Hong Kong, China
2018.12	First prize of oral report at Chemistry Sub-forum of the 11th Doctoral Student Forum of Jilin University, Changchun, China
Aug. 2017	Gordon Research Seminar-Neutron Scattering, Hong Kong, China

Publications

First author and corresponding author (†co-first author， *corresponding author)

10 Fan Jiang,† Jiahao Bian,† Hao Liu, Song Li, Xue Bai, Lirong Zheng, Sha Jin, **Zhuo Liu,*** Guang-Yu Yang,* Liang Hong,* "Creatinase: Using Increased Entropy to Improve Activity and Thermostability" ***J. Phys. Chem. B*** 127, 2671 (2023).

9 Lei Zhang, **Zhuo Liu,*** Chenxing Yang, Victoria García Sakai, Madhusudan Tyagi, Liang Hong,* "Conduction mechanism in graphene oxide membranes with varied water content: From proton hopping dominant to ion diffusion dominant" ***ACS Nano*** 16, 13771 (2022).

8 Rui Li,† **Zhuo Liu,**† Fan Jiang, Yang Zhao, Guangyu Yang,* Liang Hong* "Enhancement of thermal stability of proteinase K by biocompatible cholinium-based ionic liquids" ***Phys. Chem. Chem. Phys.*** 24, 13057 (2022).

7 Lirong Zheng,† **Zhuo Liu,**† Qiang Zhang,†,* Song Li, Juan Huang, Lei Zhang, Bing Zan, Madhusudan Tyagi, He Cheng,* Taisen Zuo, Victoria García Sakai, Takeshi Yamada, Chenxing Yang, Pan Tan, Fan Jiang, Hao Chen, Wei Zhuang,* Liang Hong* "Universal dynamical onset in water at distinct material interfaces" ***Chem. Sci.*** 13, 4341 (2022).

6 **Zhuo Liu,** Chu Li, Eshani C. Goonetilleke, Yi Cui, Xuhui Huang* "Role of surface templating on ice nucleation efficiency on a silver iodide surface" ***J. Phys. Chem. C*** 125, 18857 (2021).

5 **Zhuo Liu,**† Chenxing Yang,† Lei Zhang,† Yuanxi Yu, Minhao Yu, Victoria García Sakai, Madhu Sudan Tyagi, Takeshi Yamada, Lunhua He, Xiaohua Zhang, Liang Hong* "Heterogeneity of water molecules

on the free surface of thin reduced graphene oxide sheets" ***J. Phys. Chem. C*** 124, 11064 (2020).

4 **Zhuo Liu,**† Chenxing Yang,† Juan Huang, Gaia Ciampalini, Jun Li, Victoria García Sakai, Madhusudan Tyagi, Hugh O'Neill, Qiu Zhang, Simone Capaccioli, Kia Ling Ngai, Liang Hong* "Direct experimental characterization of contributions from self-motion of hydrogen and from interatomic motion of heavy atoms to protein anharmonicity" ***J. Phys. Chem. B*** 122, 9956 (2018).

3 **Zhuo Liu,**† Sara Lemmonds,† Juan Huang, Madhusudan Tyagi, Liang Hong* and Nitin Jain,* "Entropic contribution to enhanced thermal stability in the thermostable P450 CYP119" ***Proc. Natl. Acad. Sci. USA*** 115, E10049 (2018).

2 **Zhuo Liu,** Juan Huang, Madhusudan Tyagi, Hugh O'Neill, Qiu Zhang, Eugene Mamontov, Nitin Jain, Yujie Wang, Jie Zhang, Jeremy C. Smith,* Liang Hong,* "Dynamical transition of collective motions in dry proteins" ***Phys. Rev. Lett.*** 119, 048101 (2017).

1 **Zhuo Liu,** Xiaowei Song, Jiyang Li, Yi Li, Jihong Yu,* Ruren Xu, "$|(C_4NH_{12})_4|[M_4Al_{12}P_{16}O_{64}]$ (M = Co, Zn): New heteroatom-containing aluminophosphate molecular sieves with two intersecting 8-ring channels", ***Inorg. Chem.*** 51, 1969 (2012).

Co-author

7 Weishu Zhao,† Bozitao Zhong,† Lirong Zheng, Pan Tan, Yinzhao Wang, Hao Leng, Nicolas de Souza, **Zhuo Liu,** Liang Hong,* Xiang Xiao,* "Proteome-wide 3D structure prediction provides insights into the ancestral metabolism of ancient archaea and bacteria" ***Nat. Commun.*** 13, 7861 (2022).

6 Lirong Zheng, Hui Lu, Bing Zan, Song Li, Hao Liu, **Zhuo Liu,** Juan Huang, Yongjia Liu, Fan Jiang, Qian Liu,* Yan Feng, Liang Hong,* "Loosely-packed dynamical structures with partially-melted surface being the key for thermophilic argonaute proteins achieving high DNA-cleavage activity" ***Nucleic Acids Res.*** 50, 7529 (2022).

5 Chu Li, **Zhuo Liu,** Eshani C. Goonetilleke, Xuhui Huang* "Temperature-dependent kinetic pathways of heterogeneous ice nucleation competing between classical and non-classical nucleation" ***Nat. Commun.*** 12, 4954 (2021).

4 Juan Huang,† Qin Xu,†,* **Zhuo Liu,** Nitin Jain, Madhusudan Tyagi, Dong-Qing Wei,* Liang Hong* "Controlling the substrate specificity of an enzyme through structural flexibility by varying the salt-bridge density" ***Molecules*** 26, 5693 (2021).

3 Rui Li, **Zhuo Liu,** Like Li, Juan Huang, Takeshi Yamada, Victoria García Sakai, Pan Tan, Liang Hong* "Anomalous sub-diffusion of water in biosystems: From hydrated protein powders to concentrated protein solution to living cells" ***Struc. Dyn.*** 7, 054703 (2020).

2 Pan Tan, Juan Huang, Eugene Mamontov, Victoria García Sakai, Franci Merzel, **Zhuo Liu,** Yiyang Ye, Liang Hong* "Decoupling between the translation and rotation of water in the proximity of a protein molecule" ***Phys. Chem. Chem. Phys.*** 22, 18132 (2020).

1 Derya Vural, Xiaohu Hu, Benjamin Lindner, Nitin Jain, Yinglong Miao, Xiaolin Cheng, **Zhuo Liu,** Liang Hong, Jeremy C. Smith,* "Quasielastic neutron scattering in biology: Theory and applications" ***Biochim. Biophys. Acta*** 1861, 3638 (2017).