Yanxin Liu Ph.D.

https://blog.umd.edu/liu

Assistant Professor
Department of Chemistry and Biochemistry
Institute for Bioscience and Biotechnology Research
University of Maryland, College Park

Email: yxliu@umd.edu
Phone: 240-405-6441
Office 4127E, 9600 Gudelsky Dr.
Rockville, MD 20850

Professional Experience

- Assistant Professor (2022/01-present)
  Department of Chemistry and Biochemistry, University of Maryland College Park
- Postdoctoral Fellow & Associate Specialist (2014/08-2021/12)
  Department of Biochemistry and Biophysics, University of California, San Francisco
- Postdoctoral Research Associate (2013/07-2014/07)
  Beckman Institute and Department of Physics, University of Illinois at Urbana-Champaign

Education

- Ph. D. in Physics, University of Illinois at Urbana-Champaign, 2013
- M. S. in Physics, Florida International University, 2007
- B. S. in Applied Physics, Xi'an Jiaotong University, 2004

Honors and Awards

- UCSF-CCSF Inclusive Mentoring Fellow, University of California, San Francisco, 2021
- Independent Postdoctoral Research Award, University of California, San Francisco, 2019-2020
- American Heart Association Postdoctoral Fellowship, American Heart Association, 2018-2020
- Helen Hay Whitney Postdoctoral Fellowship
  Howard Hughes Medical Institute and Helen Hay Whitney Foundation, 2015-2018
- Outstanding Reviewer, Computers in Biology and Medicine, Elsevier, 2015
- Baxter Young Investigator Award-2nd tier, Baxter International Inc., 2014
- Chemical Computing Group Excellence Award, American Chemical Society, 2013
- Chinese Government Award for Outstanding Students Abroad, 2012
- Student Research Achievement Award, Biophysical Society 56th Annual Meeting, 2012

Research Interests

- Cryo-electron microscopy and large scale molecular dynamics simulation
- Chaperone mediated protein folding and maturation
- Protein translocations into membrane-bound organelles
- Cellular stress response

Publications (*equal contribution)

1. Zhen Chen, Garrett A. Greenan, Momoko Shiozaki, **Yanxin Liu**, Will M. Skinner, Xiaowei Zhao, Shumei Zhao, Rui Yan, Caiying Guo, Zhiheng Yu, Polina V. Lishko, David A. Agard, Ronald D. Vale. **"In situ cryo-electron tomography reveals the asymmetric architecture of mammalian sperm axonemes"**, *Nature Structural & Molecular Biology, 30:360-369, 2023.*
2. Feng Wang, **Yanxin Liu**, Zanlin Yu, Sam Li, Yifan Cheng, David A. Agard. **"General and robust covalently linked graphene oxide affinity grids for high-resolution cryo-EM"**, *Proceedings of the National Academy of Sciences, 117:24269-24273, 2020*
3. Abhinav Joshi, Li Dai, **Yanxin Liu**, Jungsoon Lee, Nastaran Mohammadi Ghahhari, Gregory Segala, Kristin Beebe, Lisa M. Jenkins, Gaelyn C. Lyons, Lilia Bernasconi, Francis T. F. Tsai, David A. Agard, Len Neckers, Didier Picard. **"The mitochondrial HSP90 paralog TRAP1 forms an OXPHOS-regulated tetramer and is involved in mitochondrial metabolic homeostasis"**, *BMC Biology, 18:10, 2020*
4. Michael Schoof, Bryan Faust, Reuben A. Saunders, Smriti Sangwan, Veronica Rezelj, Nick Hoppe, Morgane Boone, Christian B. Billesbølle, Cristina Puchades, Caleigh M. Azumaya, Huong T. Kratochvil, Marcell Zimanyi, Ishan Deshpande, Jiahao Liang, Sasha Dickinson, Henry C. Nguyen, Cynthia M. Chio, Gregory E. Merz, Michael C. Thompson, Devan Diwanji, Kaitlin Schaefer, Aditya A. Anand, Niv Dobzinski, Beth Shoshana Zha, Camille R. Simoneau, Kristoffer Leon, Kris M. White, Un Seng Chio, Meghna Gupta, Mingliang Jin, Fei Li, **Yanxin Liu**, et al. **"An ultrapotent synthetic nanobody neutralizes SARS-CoV-2 by stabilizing inactive Spike"**, *Science, 370:1473-1479, 2020*
5. David E. Gordon, Joseph Hiatt, Mehdi Bouhaddou, Veronica V. Rezelj, Svenja Ulferts, Hannes Braberg, Alexander S. Jureka, Kirsten Obernier, Jeffrey Z. Guo, Jyoti Batra, Robyn M. Kaake, Andrew R. Weckstein, Tristan W. Owens, Meghna Gupta, Sergei Pourmal, Erron W. Titus, Merve Cakir, Margaret Soucheray, Michael McGregor, Zeynep Cakir, Gwendolyn Jang, Matthew J. O'Meara, Tia A. Tummino, Ziyang Zhang, Helene Foussard, Ajda Rojc, Yuan Zhou, Dmitry Kuchenov, Ruth Hüttenhain, Jiewei Xu, Manon Eckhardt, Danielle L. Swaney, Jacqueline M. Fabius, Manisha Ummadi, Beril Tutuncuoglu, Ujjwal Rathore, Maya Modak, Paige Haas, Kelsey M. Haas, Zun Zar Chi Naing, Ernst H. Pulido, Ying Shi, Inigo Barrio-Hernandez, Danish Memon, Eirini Petsalaki, Alistair Dunham, Miguel Correa Marrero, David Burke, Cassandra Koh, Thomas Vallet, Jesus A. Silvas, Caleigh M. Azumaya, Christian Billesbølle, Axel F. Brilot, Melody G. Campbell, Amy Diallo, Miles Sasha Dickinson, Devan Diwanji, Nadia Herrera, Nick Hoppe, Huong T. Kratochvil, **Yanxin Liu** et al. **"Comparative host-coronavirus protein interaction networks reveal pan-viral disease mechanisms"**, *Science, 370:abe9403, 2020.*
6. Shao-Qing Zhang, Hai Huang, Junjiao Yang, Huong T. Kratochvil, Marco Lolicato, **Yanxin Liu**, Xiaokun Shu, Lijun Liu, William F. DeGrado. **"Design of peptides that assemble into cross-α amyloid-like structures"**, *Nature Chemical Biology, 14:870-875, 2018 [Highlighted in News & Views "Mimicking cross-α amyloids"]*
7. Daniel Elnatan, Miguel Betegon, **Yanxin Liu**, Theresa Ramelot, Michael A. Kennedy, David A. Agard. **"Symmetry broken and rebroken during the ATP hydrolysis cycle of the mitochondrial Hsp90 TRAP1"**, *eLife, 6:e25235, 2017*
8. Kliment A. Verba, Ray Y. R. Wang, Akihiko Arakawa, **Yanxin Liu**, Mikako Shirouzu, Shigeyuki Yokoyama, David A. Agard. **"Atomic structure of Hsp90-Cdc37-Cdk4 reveals that Hsp90 traps and stabilizes an unfolded kinase"**, *Science, 352:1542-1547, 2016.*
9. Anna Jean Wirth*, **Yanxin Liu***, Maxim B. Prigozhin, Klaus Schulten, and Martin Gruebele. **"Comparing fast pressure jump and temperature jump protein folding experiments and simulations."**, *Journal of the American Chemical Society, 137:7152-7159, 2015.*

10. En Cai, Pinghua Ge, Sang Hak Lee, Okunola Jeyifous, Yong Wang, **Yanxin Liu**, Katie M. Wilson, Sung Jun Lim, Michele A. Baird, John E. Stone, Kwan Young Lee, David G. Fernig, Michael W. Davidson, Hee Jung Chung, Klaus Schulten, Andrew M. Smith, William N. Green, Paul R. Selvin. **"Stable small quantum dots for synaptic receptor tracking on live neurons."**, *Angewandte Chemie International Edition, 126:12692-12696, 2014.*

11. Qiangjun Zhou, Jiangmei Li, Hang Yu, Yujia Zhai, Zhen Gao, **Yanxin Liu**, Xiaoyun Pang, Lunfeng Zhang, Klaus Schulten, Fei Sun, and Chang Chen. **"Molecular insights into the membrane-associated phosphatidylinositol 4-kinase IIα."**, *Nature Communications, 5:3552, 2014.*

12. **Yanxin Liu**, Maxim B. Prigozhin, Klaus Schulten, and Martin Gruebele. **"Observation of complete pressure-jump protein refolding in molecular dynamics simulation and experiment."**, *Journal of the American Chemical Society, 136:4265-4272, 2014. [Cover article and highlighted by the Editors in JACS Spotlights]*

13. Yong Wang, **Yanxin Liu**, Hannah A. DeBerg, Takeshi Nomura, Melinda Tonks-Hoffman, Paul R. Rohde, Klaus Schulten, Boris Martinac, and Paul R. Selvin. **"Single molecule FRET reveals pore size and opening mechanism of a mechano-sensitive ion channel."**, *eLife, 3:e01834, 2014.*

14. Kai Zhang, Li Wang, **Yanxin Liu**, Kwok-Yan Chan, Xiaoyun Pang, Klaus Schulten, Zhiyang Dong, and Fei Sun. **"Flexible interwoven termini determine the thermal stability of thermosomes."**, *Protein & Cell, 4:432-444, 2013. [Cover article]*

15. Maxim B. Prigozhin, **Yanxin Liu**, Anna Jean Wirth, Shobhna Kapoor, Roland Winter, Klaus Schulten, and Martin Gruebele. **"Misplaced helix slows down ultrafast pressure-jump protein folding."**, *Proceedings of the National Academy of Sciences, 110:8087-8092, 2013.*

16. Ying Lai, Jiajie Diao, **Yanxin Liu**, Yuji Ishitsuka, Zengliu Su, Klaus Schulten, Taekjip Ha, and Yeon-Kyun Shin. **"Fusion pore formation and expansion induced by Ca^{2+} and synaptotagmin 1."**, *Proceedings of the National Academy of Sciences, 110:1333-1338, 2013.*

17. Xue Wang, Fengting Xu, Jiasen Liu, Bingquan Gao, **Yanxin Liu**, Yujia Zhai, Jun Ma, Kai Zhang, Timothy Baker, Klaus Schulten, Dong Zheng, Hai Pang, and Fei Sun. **"Atomic model of rabbit hemorrhagic disease virus by cryo-electron microscopy and crystallography."**, *PLOS Pathogens, 9:e1003132, 2013.*

18. **Yanxin Liu**, Johan Strümpfer, Peter L. Freddolino, Martin Gruebele, and Klaus Schulten. **"Structural characterization of λ-repressor folding from all-atom molecular dynamics simulations."**, *Journal of Physical Chemistry Letters, 3:1117-1123, 2012.*

19. **Yanxin Liu***, Jen Hsin*, HyeongJun Kim, Paul R. Selvin, and Klaus Schulten. **"Extension of a three-helix bundle domain of myosin VI and key role of calmodulins."**, *Biophysical Journal, 100:2964-2973, 2011. [Cover article]*

20. HyeongJun Kim*, Jen Hsin*, **Yanxin Liu***, Paul R. Selvin, and Klaus Schulten. **"Formation of salt bridges mediates internal dimerization of myosin VI medial tail domain."**, *Structure, 18:1443-1449, 2010. [Previewed article]*

21. Peter L. Freddolino, Christopher B. Harrison, **Yanxin Liu**, and Klaus Schulten. **"Challenges in protein folding simulations."**, *Nature Physics, 6:751-758, 2010.*

22. Xueqing Zou, **Yanxin Liu**, Zhongzhou Chen, Gloria Ines Cárdenas-Jirón, and Klaus Schulten. **"Flow-induced β-hairpin folding of the Glycoprotein Ib_α β-switch."**, *Biophysical Journal, 99:1182-1191, 2010.*

23. **Yanxin Liu**, Prem P. Chapagain, and Bernard S. Gerstman. **"Stabilization of native and non-native structures by salt bridges in a lattice model of the GCN4 leucine dimer."**, *Journal of Physical Chemistry B, 114:796-803, 2010.*

24. Prem P. Chapagain, **Yanxin Liu**, and Bernard S. Gerstman. **"The trigger sequence in the GCN4 leucine zipper: α-helical propensity and multistate dynamics of folding and dimerization."**, *Journal of Chemical Physics, 129:175103, 2008.*
25. **Yanxin Liu**, Prem P. Chapagain, Jose L. Parra, and Bernard S. Gerstman. **"Lattice model simulation of interchain protein interactions and the folding dynamics and dimerization of the GCN4 Leucine zipper."**, *Journal of Chemical Physics, 128:045106, 2008.*
26. Prem P. Chapagain, Jose L. Parra, Bernard S. Gerstman, and **Yanxin Liu**. **"Sampling of states for estimating the folding funnel entropy and energy landscape of a model α-helical hairpin peptide."**, *Journal of Chemical Physics, 127:075103, 2007.*
27. **Yanxin Liu**, Yongchang Wang, and Shaoyi Du. **"The study of I-V characteristics of single electron triple-barrier tunnel-junction."**, *Acta Physica Sinica, 53:2734-2740, 2004.*

Selected Talks

1. 2022/12/10, Society of Chinese Bioscientists in America DC-Baltimore Chapter Annual Scientific Symposium
2. 2022/11/16, Biological Sciences Graduate Program-Computational Biology, Bioinformatics and Genomics, University of Maryland College Park
3. 2022/10/25, Protein Folding Dynamics, Gordon Research Conference
4. 2022/10/14, Department of Chemical and Biomolecular Engineering, University of Maryland College Park
5. 2022/10/11, Bioscience Day Seminar, University of Maryland College Park
6. 2022/09/19, Department of Biochemistry and Molecular Biology, University of Maryland School of Medicine
7. 2021/11/29, Biophysics Program, University of Maryland College Park
8. 2021/10/27, Biological Sciences Graduate Program-Molecular and Cellular Biology, University of Maryland College Park
9. 2021/05/25, Department of Physics and Astronomy, University of Missouri Columbia