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A. EDUCATION AND EMPLOYMENT INFORMATION

EDUCATION

- Ph.D. (2008) Biophysics, The Ohio State University, Columbus, USA.
Dissertation: "Ultrafast Protein Hydration Dynamics Investigated by Femtosecond Fluorescence Spectroscopy"
PhD. Advisor: Dongping Zhong
- M.Sc (2002) Applied Physics, Nankai University, Tianjin, China
- B.Sc (1999) Physics, Nankai University, China, Tianjin, China

PROFESSIONAL APPOINTMENTS

- 2019 – Associate Professor – Department of Physics, Oregon State University, USA
- 2013 – 2019 Assistant Professor – Department of Physics, Oregon State University, USA
(Adjunct Professor – Department of Biochemistry and Biophysics, Since 2013)
- 2008 – 2013 Postdoctoral Researcher – Department of Cell Biology, Harvard Medical School,
Postdoctoral Advisor: Samara L. Reck-Peterson
- 2002 – 2008 Graduate Research Assistant – Department of Physics, The Ohio State University,
Graduate Advisor: Dongping Zhong

B. SCHOLARSHIP AND CREATIVE ACTIVITY

1. PUBLICATIONS

- †: First or co-first author
*: Corresponding or co-corresponding authorship
UG: Undergraduate student
_: Members of the Qiu group

AS AN INDEPENDENT PI AT OREGON STATE UNIVERSITY

a. RESEARCH ARTICLES UNDER REVIEW AND IN PREPARATION

1. Tseng, K.-F. †, Mickolajczyk, K.J. †, Feng, Q.Z., Howe, J., Barbar, E., Dawson, S.C., Hancock, W.O. and Qiu, W.H. * (2019) The N-terminal tail dual-regulates the motility of Giardia kinesin-14a. *Cur. Biol.* (In Revision).

b. PEER-REVIEWED RESEARCH ARTICLES

2. Gicking, A.M. †, Wang, P. †, Liu, C., Mickolajczyk, K.J., Guo, L.J., Hancock, W.O. and Qiu, W.H. * (2019) The orphan kinesin PAKRP2 achieves processive motility via noncanonical stepping. *Biophys. J.* 116, 1270-1281.
3. Wang, P. †, Tseng, K.-F. †, Gao, Y. ^{UG}, Cianfrocco, M., Guo, L.J. and Qiu, W.H. * (2018) The central stalk determines the motility of mitotic kinesin-14 homodimers. *Cur. Biol.* 28, 2302–2308.
Featured in OSU Research News, EurekAlert!, ScienceDaily, and Phys.org.
4. Popchock, A.R. †, Jana, S., Mehl, R.A. *, and Qiu, W.H. * (2018) Engineering heterodimeric kinesins through genetic incorporation of noncanonical amino acids. *ACS Chem. Biol.* 13, 2229-2236.
5. Dawe, R.K. †, Lowry, E.G., Gent, J.I., Stitzer, M.C., Swentowski, K.W., Higgins, D.M., Ross-Ibarra, J., Wallace, J.G., Kanizay, L.B., Alabady, M., Qiu, W.H., Tseng, K.-F., Wang, N., Gao, Z., Birchler, J.A.,

Harkess, A.E., Hodges, A.L., and Hiatt, E.N. (2018) A kinesin-14 motor activates neocentromeres to promote meiotic drive in Maize. **Cell** 173, 1–12.

6. Tseng, K.-F.[†], Wang, P.[†], Lee, Y.-R.[†], Bowen, J.^{UG}, Gicking, A.M., Guo, L.J., Liu, B.* , and Qiu, W.H.* (2018) The preprophase band-associated kinesin-14 OsKCH2 is a processive minus-end-directed microtubule motor. **Nat. Commun.** 9, 1067.

Featured in OSU Research News, EurekAlert!, ScienceDaily and Phys.org.

7. Li, Q., Tseng, K.-F., King, S.J., Qiu, W.H., and Xu, J.* (2018) A fluid membrane enhances the velocity of cargo transport by small teams of kinesin-1. **J. Chem. Phys.** 148, 12331.
8. Hams, N., Padmanarayana, M., Qiu, W.H., and Johnson C.P.* (2017) Otoferlin is a multivalent calcium sensitive scaffold linking SNAREs and calcium channels. **Proc. Natl. Acad. Sci. USA** 114, 8023–8028.
9. Popchock, A. R.[†], Tseng, K.-F.[†], Wang, P., Karplus, P. A., Xiang, X., and Qiu, W.H.* (2017) The mitotic kinesin-14 KlpA contains a context-dependent directionality switch. **Nat. Commun.** 7, 13999.

Featured in OSU Research News, EurekAlert!, ScienceDaily, Phys.org, and China Xinhua News.

C. PEER-REVIEWED INVITED REVIEW ARTICLES

9. Gicking, A.M., Swentowsky, K.W., Dawe, R.K.* , and Qiu, W.H.* (2018) Functional diversification of the kinesin-14 family in land plants. **FEBS Lett.** 592: 1918-1928.
10. Gicking, A.M., Qiu, W.H.* , and Hancock W.O.* (2018) Mitotic kinesins in action: Diffusive searching, directional switching and ensemble coordination. **Mol. Biol. Cell**, 29: 1153-1156.
11. Lee, Y.-R., Qiu, W.H., and Liu, B. (2015). Kinesin motors in plants: from subcellular dynamics to motility regulation. **Curr. Opin. Plant Biol.** 28,120–126.

AS A POSTDOCTORAL RESEARCHER AT HARVARD MEDICAL SCHOOL

12. Cheng, L., Desai, J., Miranda, C. J., Duncan, J. S., Qiu, W. H., Nugent, A. A., Kolpak, A. L., Wu, C. C., Drokhyansky, E., Delisle, M. M., et al. (2014) Human CFEOM1 mutations attenuate KIF21A autoinhibition and cause oculomotor axon stalling. **Neuron** 82, 334–49.
13. Qiu, W. H.[†], Derr, N.D.[†], Goodman, B. S., Villa, E., Wu, D., Shih, W., Reck-Peterson, S.L. (2012) Dynein achieves processive motion using both stochastic and coordinated stepping. **Nat. Struct. Mol. Biol.** 19, 193-200. *Commentary on this research appeared in Nature* 482: 7383.
14. Su, X.L., Qiu, W. H., Gupta, M.L., Pereira-Leal, J.B., Reck-Peterson, S.L., Pellman, D.* (2011). Mechanisms underlying the dual-mode regulation of microtubule dynamics by Kip3/Kinesin-8. **Mol. Cell** 43, 751-763.

AS A GRADUATE STUDENT AT OHIO STATE UNIVERSITY

15. Qin, Y., Yang, Y., Zhang, L., Fowler, J.D., Qiu, W. H., Wang, L., Suo, Z., Zhong, D.P.* (2013) Direct probing of solvent accessibility and mobility at the binding interface of polymerase (Dpo4)-DNA complex. **J. Phys. Chem. A.** 117, 13926-34.
16. Qiu, W. H.[†], Li, T. P.[†], Zhang, L. Y., Kao, Y.-T., Wang, L. J., and Zhong, D. P.* (2008). Ultrafast quenching of tryptophan fluorescence in proteins: Interresidue and intrahelical electron transfer. **Chem. Phys.** 350, 154-164.
17. Zhang, L. Y., Wang, L. J., Kao, Y. T., Qiu, W. H., Yang, Y., Okobiah, O., and Zhong, D. P.* (2007). Mapping hydration dynamics around a protein surface. **Proc. Natl. Acad. Sci. USA** 104, 18461-18466.
18. Qiu, W. H., Wang, L. J., Lu, W. Y., Boechler, A., Sanders, D. A. R., and Zhong, D. P.* (2007). Dissection of complex protein dynamics in human thioredoxin. **Proc. Natl. Acad. Sci. USA** 104, 5366-5371.

19. Qiu, W. H., Kao, Y. T., Zhang, L. Y., Yang, Y., Wang, L. J., Stites, W. E., Zhong, D. P.* and Zewail, A. H.* (2006). Protein surface hydration mapped by site-specific mutations. *Proc. Natl. Acad. Sci. USA* 103, 13979-13984.
20. Kim, J., Lu, W. Y., Qiu, W. H., Wang, L. J., Caffrey, M., and Zhong, D. P.* (2006). Ultrafast hydration dynamics in the lipidic cubic phase: Discrete water structures in nanochannels. *J. Phys. Chem. B* 110, 21994-22000.
21. Zhang, L. Y., Kao, Y. T., Qiu, W. H., Wang, L. J., and Zhong, D. P.* (2006). Femtosecond studies of tryptophan fluorescence dynamics in proteins: Local solvation and electronic quenching. *J. Phys. Chem. B* 110, 18097-18103.
22. Qiu, W. H.[†], Zhang, L. Y.[†], Okobiah, O., Yang, Y., Wang, L. J., Zhong, D. P.*, and Zewail, A. H.* (2006). Ultrafast solvation dynamics in human serum albumin: Correlations with conformational transitions and site-selected recognition. *J. Phys. Chem. B* 110, 10540-10549.
23. Qiu, W. H., Zhang, L. Y., Kao, Y. T., Lu, W. Y., Li, T. P., Kim, J., Sollenberger, G. M., Wang, L. J., and Zhong, D. P.* (2005). Ultrafast hydration dynamics in melittin folding and aggregation: Helix formation and tetramer self-assembly. *J. Phys. Chem. B* 109, 16901-16910.
24. Lu, W. Y., Qiu, W. H., Kim, J., Okobiah, O., Hu, H. X., Gokel, G. W., and Zhong, D. P.* (2004). Femtosecond studies of crown ethers: supramolecular solvation, local solvent structure and cation pi interaction. *Chem. Phys. Letters* 394, 415-422.
25. Lu, W. Y., Kim, J., Qiu, W. H., and Zhong, D. P.* (2004). Femtosecond studies of tryptophan solvation: correlation function and water dynamics at lipid surfaces. *Chem. Phys. Letters* 388, 120-126.

2. INVITED AND PEER SELECTED PRESENTATIONS

a. TALKS AT MEETINGS/CONFERENCES

1. ASCB|EMBO Subgroup Meeting on Building Complexity to Understand the Microtubule Cytoskeleton, "TinA enables kinesin-14/KlpA for spindle pole localization", Washington, DC USA, 2019.
2. Biophysical Society Subgroup Meeting on the Motility and Cytoskeleton, "Kinesin-14s: Moving into a new paradigm", San Francisco, CA USA, 2018.
3. ASCB Subgroup Meeting on the Emergent Phenomena and New Paradigms of Molecular Motors, "Engineering novel processive minus-end-directed kinesin-14 motors", Philadelphia, PA USA, 2017.
4. OCPA 9 International Conference, "KlpA is a novel kinesin-14 motor with tunable directionality", Beijing, China, 2017. *Keynote Address*.
5. Gordon Conference on Plant & Microbial Cytoskeleton, "OsKCH2 is a homodimeric processive minus end-directed kinesin motor", West Dover, VT USA, 2016.
6. 18th Annual Meeting of the APS Northwest Section, "KlpA is a novel processive kinesin-14 motor with tunable directionality", 2017. *Keynote Address*.
7. Gordon Research Conference on Muscle & Molecular Motors, "The mitotic kinesin-14 KlpA contains a context-dependent directionality switch", Andover, NH USA, 2016.

b. INVITED SEMINARS/COLLOQUIA

1. Department of Physics Colloquium, Wayne State University, "Kinesin-14s: Moving into a New Paradigm", 2018.
2. Department of Physics Colloquium, University of Texas Rio Grande Valley, "Kinesin-14s: Moving into a New Paradigm", 2018.
3. Department of Biological Science Colloquium, Rensselaer Polytechnic Institute, "Kinesin-14s: Moving into a New Paradigm", 2018.
4. Biophysics Seminar, The Ohio State University, "Kinesin-14s: Moving into a New Paradigm", 2018.

5. Biomedical Engineering Seminar, Penn State University, "Kinesin-14s: Moving into a New Paradigm", 2018.
6. Department of Physics Colloquium, University of California, Merced, "KlpA is a novel processive kinesin-14 motor with tunable directionality", 2017.
7. Institute of Molecular Biology Seminar, University of Oregon, "The mitotic kinesin-14 KlpA contains a context-dependent directionality switch", 2016.
8. Mathematical Biology Seminar, Oregon State University, "Looking through the lens: the mechanism of molecular motors", 2015.
9. Department of Chemistry Seminar, Oregon State University, "Shining light on the molecular mechanism of microtubule motors", 2014.
10. Center for Genome Research and Biocomputing Seminar, Oregon State University, "Shining light on the molecular mechanism of microtubule motors", 2014.
11. Department of Physics Seminar, Willamette University, "Shining light on the molecular mechanism of microtubule motors", 2013.

3. ORAL AND POSTER PRESENTATIONS (TRAINEE)

1. ASCB/EMBO 2018 Annual Meeting, "The kinesin-14 GiKin14a of Giardia uses coordinated stepping to achieve processive minus-end-directed motility", San Diego USA, December 8-12 2018. (Poster Presentation by my postdoc Kuo-Fu Tseng).
2. 62nd Annual Biophysical Society Meeting, "Single molecule characterization of the processive orphan kinesin AtPAKRP2", San Francisco, CA USA, 2018. (Poster Presentation by my graduate student Allison Gicking).
3. Chemical Biology and Physiology Conference, "A versatile toolbox for creating heterodimeric kinesin motors through genetic code expansion", Portland, OR USA, 2017. (Poster Presentation by my graduate student Andrew Popchock).
4. 18th Annual Meeting of the APS Northwest Section, "OsKCH2 is a novel processive minus end-directed kinesin-14 motor", Forest Grove, OR USA, 2017 (Oral Presentation by my graduate student Allison Gicking).
5. Gordon Research Conference on Cytoskeletal Motor, "OsKCH2 is a homodimeric processive minus end-directed kinesin motor", West Dover, VT USA, 2016. (Poster Presentation by my postdoc Dr. Kuo-Fu Tseng).
6. Life at the Nanoscale Mini Symposium, "OsKCH2 is a homodimeric processive minus end-directed kinesin motor", University of Oregon, 2016. (Poster Presentation by my postdoc Dr. Kuo-Fu Tseng).
7. Life at the Nanoscale Mini Symposium, "The mitotic kinesin-14 KlpA contains a context-dependent directionality switch", University of Oregon, 2016. (Poster Presentation by my graduate student Andrew Popchock).

4. GRANTS AND CONTRACTS

1. CURRENT SUPPORT

Project: "Collaborative Proposal: Establishing the microtubule-actin crosstalk in the preprophase band by the rice kinesin OsKCH2"

Source: National Science Foundation

PI: Qiu;

Duration: 08/01/2016-07/31/2020

Total Funds: \$518,412

Project: "Mechanistic analysis of kinesin-14 motility and regulation for bipolar spindle assembly"

Source: National Institutes of Health (R01)

PI: Qiu

Duration: 09/01/2019-08/31/2024

Total Funds: \$1,548,689

2. PAST SUPPORT

Project: "Integration of multiple approaches to understand biology: Focus on intrinsically disordered proteins"

Source: Oregon State University, College of Science Impact Award

PIs: Barbar (Biochemistry and Biophysics, BB), Nyarko (BB), Perez (BB), Qiu (Physics), Eschbach (EM Facility);

Duration: 09/01/2017-08/31/2018

Total Funds: \$10,000 (Qiu: \$2,000)

Project: "Molecular basis of autoinhibition in human kinesin Kif21A"

Source: Oregon Health and Science University Medical Research Foundation

PI: Qiu

Duration: 06/01/2014-05/31/2015

Total Funds: \$40,000

Project: "Biological motions through the lens: Advanced light microscopy facility at Oregon State University"

Source: The Soeldner Campbell Fund of The Oregon Community Foundation

PIs: Qiu, Sun, and Zee;

Duration: 06/01/2014-05/31/2015

Total Funds: \$3,500