

Xiaohu Wan, Ph.D.

DEPARTMENT OF BIOLOGY

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

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Education and Training

Postdoctoral Research Associate, Biology Department

University of North Carolina at Chapel Hill present

Postdoctoral Fellow, Biology Department

University of North Carolina at Chapel Hill 2009 - 2013

Ph.D., Biomedical Engineering

University of North Carolina at Chapel Hill 2003 - 2008

M.S., Biomedical Engineering

University of North Carolina at Chapel Hill 1999 - 2002

B.S., Electrical Engineering and Information Science

University of Science and Technology of China 1991 - 1996

Professional experience

Postdoctoral Research Assistant, Department of Biology, UNC

present

- Develop novel quantitative fluorescence imaging methods to dissect protein structure.
- Develop novel image analysis methods to determine protein complex size (protein number).
- Use polarized fluorescence microscopy to study cytoskeletal organization *in vivo* during cytokinesis.
- Use mathematical modeling to study cytokinesis.

Postdoc, Department of Biology, UNC

2009 - 2013

- Studied kinetochore dynamics with biophysical, quantitative and modeling methods.
- Characterized the function of spindly with super-resolution techniques.
- Dissected the structure of RZZ complex.

Graduate Research Assistant, Department of Biomedical Engineering, UNC

2003 - 2008

- Developed super-resolution microscopy method to study the molecular structure of the kinetochore at nm accuracy.
- Designed user-friendly software program to efficiently analyze biological data.

Engineer, Department of Otolaryngology, UNC

2002 - 2003

- Designed a real-time and fully automatic data acquisition/analysis system used in the study of behavioral neuroscience, including hardware implementation and software development.

Research Assistant, Department of Radiation Oncology, UNC

1999 - 2002

- Designed a medical image analysis and management system for analyzing and registering patient's X-ray and CT images to improve the accuracy of radiation treatment.

Engineer, Rady Company, Beijing, China

1997 - 1999

- Designed and set up city scale computer networks.
- Developed online software system.
- Conducted technical training.

Invited talks

- 2013, Clemson University, Department Seminar, "Nanometer-scale protein architecture of kinetochore and its directional instability during metaphase oscillation"

- 2013, University of California, Merced , Department Seminar, “Super-resolution kinetochore architecture and kinetochore directional instability”
- 2012, University of Massachusetts, Amherst, department seminar, “K-SHREC principle and software”
- 2010, NIH, Bethesda, MD, Imaging Group Seminar, “Development of a two-color super-resolution microscopy method”
- 2007, NIST, Gaithersburg, MD, Biophysics Branch Seminar, “Discover biology through image analysis”

Publications

- Descovich, C.P., Zhang, L., **Wan, X.**, Maddox, P.S., Maddox, A.S., Cytoskeletal crosslinkers attenuate cytokinetic furrowing. (In review)
- Suzuki, A., Badger, B., **Wan, X.**, Salmon, E.D., (2014). The Architecture of CCAN Proteins Within Human Kinetochores Creates a Structural Integrity to Resist Spindle Forces and Achieve Proper Intra-kinetochore Stretch. **Dev. Cell.** 30(6):717-30
- **Wan, X.**^{*}, Varma, D.^{*}, Cheerambathur, D., Gassmann, R., Suzuki, A., Lawrimore, J., Desai, A., Salmon, E. D., (2013). Spindle Assembly Checkpoint Proteins are Positioned Close to Core Microtubule Attachment Sites at Kinetochores. **J Cell Biol.** 202(5):735-46 (^{*} contributed equally)
- Civelekoglu-Scholey, G., He, B., Shen, M., **Wan, X.**, Roscioli, E., Bowden, B., Cimini, D., (2013). Quantitative model of metaphase chromosome dynamics via viscoelastic bonds. **J Cell Biol.** 201(4):577-93
- Varma,D., Chandrasekaran, S., Sundin, L., Reidy, K., **Wan, X.**, Chasse, D.A., Nevis, K.R., DeLuca, J.G., Salmon, E.D., Cook, J.G. (2012). Recruitment of the human Cdt1 replication licensing protein by the loop domain of Hec1 is required for stable kinetochore microtubule attachment. **Nat Cell Biol.** 14(6):593-603
- **Wan, X.**, Cimini, D., Cameron, L.A., and Salmon, E.D. (2012). The coupling between sister kinetochore directional instability and oscillations in centromere stretch in metaphase PtK1 cells. **Moll Biol Cell.** 23(6): 1035-46.
- Gassmann, R., Holland, A.J., Varma D., **Wan X.**, Civril F., Cleveland D.W., Oegema K., Salmon E.D., Desai A. (2010). Removal of Spindly from microtubule-attached kinetochores controls spindle checkpoint silencing in human cells. **Genes Dev.** 24(9):957-71.
- **Wan, X.**, O'Quinn, R.P., Pierce, H.L., Joglekar, A.P., Gall, W.E., DeLuca, J.G., Carroll, C.W., Liu, S.T., Yen, T.J., McEwen, B.F., Stukenberg, T., Desai, A., Salmon, E.D. (2009). Protein architecture of the human kinetochore microtubule attachment site. **Cell** 137(4):672-84
- Cimini, D., **Wan, X.**, Hirel, C.B., and Salmon, E.D. (2006). Aurora kinase promotes turnover of kinetochore-microtubules to reduce chromosome segregation errors by merotelic kinetochore orientation. **Curr Biol.** 16(17):1711-8

Manuscripts in preparation

- **Wan, X.**, Salmon, E.D., Multidimensional Super-Resolution Speckle Analysis Method.
- **Wan, X.**^{*}, O'Quinn, R.P.^{*}, Maresca, T., Varma D., Antoni A., Musacchio A., Salmon, E.D., Spindly Depletion Delays Intrakinetochore Stretch and Release of Mad1/Mad2 from Sites Proximal to the Calponin Homology Domain of Ndc80 and Near to the Ska Complex. (^{*} contributed equally)

Recent conference abstracts

- **Wan, X.**, Descovich, CP, Applewhite, D., Rogers, S., Maddox, P., Maddox, A., Counting molecules in non-muscle myosin II filaments, The 54th Annual Meeting of the American Society for Cell Biology (ASCB), December 2014
- Cane, S., **Wan, X.**, Sanghvi, J., Maresca, T.J.; Tension-Based Elongation of Drosophila Kinetochore Protein CENP-C Promotes Stabilization of Kinetochore-Microtubule Attachments, The 54th Annual Meeting of ASCB, December 2014
- Suzuki, A., Badger, B., **Wan, X.**, Salmon, E.D.; Protein Architecture and Compliance of the Human CCAN Protein Network that Links CENP-A Chromatin to the Kinetochore Microtubule Attachment Site, The 53th Annual Meeting of ASCB, December 2013
- Suzuki, A., **Wan, X.**, Salmon, E.D.; The KMN network makes major conformational changes with kinetochore microtubule formation not exhibited by other outer domain proteins like RZZ and CENP-F, The 52th Annual Meeting of ASCB, December 2012
- **Wan, X.**^{*}, Varma, D.^{*}, Gassmann, R., Lawrimore, J., Desai, A., Salmon, E. D.; Location of the Mad1/Mad2 Complex, Zwint1, the Rod/Zw10/Zwilch (RZZ) Complex, and the Dynein Motor Recruitment Factor Spindly Within the Substructure of the Kinetochore, The 52th Annual Meeting of ASCB, December 2012 (^{*}contributed equally)
- Varma, D., Chandrasekaran, S., Sundin, L., Reidy, K., **Wan, X.**, *et al*; An essential mitotic role for the DNA replication protein, Cdt1, The 52th Annual Meeting of ASCB, December 2012
- **Wan, X.**, Cimini, D., Cameron, L.A., and Salmon, E.D.; Kinetochore microtubule polymerization/depolymerization switches are different from kinetochore P/AP switches and are associated with centromere tension during metaphase oscillation, FASEB meeting, August 2012
- Suzuki, A., **Wan, X.**, Salmon, E.D.; Major changes in protein architecture of the KMN network between unattached and attached kinetochore, FASEB meeting, August 2012
- **Wan, X.**, Cimini, D., Cameron, L.A., and Salmon, E.D.; The coupling between sister kinetochore directional instability and oscillations in centromere stretch in metaphase PtK1 cells, Biophysical Society 56th Annual Meeting, March 2011
- Dong, Y., Meng, X., O'Quinn, R., **Wan, X.** *et al*, Structure Conformations of the Mammalian Kinetochore as Seen by Immuno-EM and High Resolution Immuno-LM, The 50th Annual Meeting of ASCB, December 2010
- Varma, D., **Wan, X.**, Gassmann, R., Desai, A., Salmon, E. D.; Location of the RZZ Complex within the Core Kinetochore Microtubule Attachment Site, The 50th Annual Meeting of ASCB, December 2010