WAN-CHEN LIN

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EDUCATION

Ph.D., Biophysics, University of California-Davis, December 2006.
Dissertation: Mimicking Leaflet Asymmetries and Lateral Heterogeneities in Plasma Membranes, a Supported Lipid Bilayer Study.
Advisor: Dr. Marjorie L. Longo.

Bachelor of Science, Physics, National Taiwan University, June 1999.

RESEARCH EXPERIENCE

Postdoctoral Research, Groves Lab (PI: Dr. Jay Groves), Chemistry Department, University of California-Berkeley, Berkeley, CA. 06/2008 -present.

- Using self-assembling lipid membrane and protein structures on inorganic materials as platform to study protein-protein interaction, protein clustering and spatial rearrangement at the live cell - supported membrane junctions.

Postdoctoral Research, Joint appointment with Groves Lab (PI: Dr. Jay Groves), Chemistry Department, University of California-Berkeley, Berkeley, CA and Longo Lab (PI: Dr. Marjorie Longo), Biophysics Graduate Group, University of California-Davis, Davis, CA. 06/2007 -06/2008.

- Use fluorescent correlation spectroscopy (FCS) to investigate lipid mobility modulation by charged lipids and metal cations

Doctoral Research, Longo Lab (PI: Dr. Marjorie Longo), Biophysics Graduate Group, University of California-Davis, Davis, CA. 09/2001 -12/2006.

- Designed suitable supported lipid bilayer platforms to study ligand-surface interaction
- Used various fluorescent techniques and atomic force microscopy (AFM) to study
  - Mechanisms of formation and stability of supported lipid bilayers
  - Transbilayer symmetry and its evolution
  - Phase behavior and the effect of cholesterol on liquid-solid coexisting and liquid-liquid coexisting supported lipid bilayers
  - Mechanisms of domain nucleation and growth in non-ideal mixing lipid bilayers
- Designed and built a total internal reflection fluorescence (TIRF) microscope
- Designed a single particle tracking (SPT) system
- Safety coordinator
- Mentored visiting scholars and intern students

Research Assistant, High-Resolution Optical Fabrication and Microscopy Laboratory (PI: Dr. Chau-Hwang Lee), Research Center for Applied Sciences, Academia Sinica, Taipei, Taiwan. 07/1999 - 08/2001.

- Designed and built a differential confocal microscope (DCM)
- Developed and built a non-interferometric optical profilometer without scanning mechanisms
- Measured the mechanical properties of bilayer lipid membranes
- Equipment manager
- Safety coordinator

Research Assistant, High-Field Physics and Ultra-fast Technology Laboratory (PI: Dr. Jyhpyng Wang), Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan. 07/1998 - 06/1999.

- Developed nanometer-resolution differential confocal microscopy
- Prepared lipid bilayer samples: black membranes and giant vesicles

TEACHING EXPERIENCE

Grader, Membrane Biology, UC Davis, Spring 2006. Dr. Marjorie Longo. Biophysics Graduate Program.

Mentor, Summer Undergraduate Research Experiences Program, Center on Polymer Interfaces and Macromolecular Assemblies (CPIMA), Summer 2003, Summer 2004, Summer 2005.

- Designed summer project and advised student in everyday lab work.
- Performed equipments and safety training.
- Evaluated final reports.

HONORS AND AWARDS

- Anthony Summer Research Award, UCD, summer 2004
- Earle C. Anthony Fellowship, UCD, 2002-2003 academic year
- Nonresident Tuition Fellowship for Junior Faculty, UCD, 2001-2003 academic year

PUBLICATIONS

- E. L. Goksu,B. Nellis, **W.-L. Lin**, J. Satcher, J. T. Groves, S. Risbud, M. L. Longo, "Effect of Support Corrugation on Silica-Xerogel Supported Phase-Separated Lipid Bilayers," *Langmuir*, 25(6): 3713-3717 (2009).
- E. L. Goksu, J. M. Vanegas, C. D. Blanchette, **W.-C. Lin**, and M. L. Longo, “AFM for Structure and Dynamics of Biomembranes,” *Biochimica et Biophysica Acta (BBA) – Biomembranes,* 1788: 254-266 (2009).
- C. D. Blanchette, **W.-C. Lin**, C. A. Orme, T. V. Ratto, and M. L. Longo, “Domain Nucleation Rates and Interfacial Line Tensions in Supported Bilayers of Ternary Mixtures Containing Galactosylceramide,” *Biophysical Journal,* 94: 2691-2697 (2008).
- C. D. Blanchette, **W.-C. Lin**, C. A. Orme, T. V. Ratto, and M. L. Longo, “Using Nucleation Rates to Determine the Interfacial Line Tension of Symmetric and Asymmetric Lipid Bilayer Domains,” *Langmuir (Letter)* **23**: 5875-5877 (2007).

- **W.-C. Lin**, C. D. Blanchette, and M. L. Longo, "Fluid-Phase Chain Unsaturation Controlling Domain Microstructure and Phase in Ternary Lipid Bilayers Containing GalCer and Cholesterol," *Biophysical Journal* **92**: 2831-2841 (2007).
- **W.-C. Lin**, C. D. Blanchette, T. V. Ratto, and M. L. Longo, "Lipid domains in supported lipid bilayer for atomic force microscopy," invited in *Protocols in Biophysics to Study Membrane Lipids*, editor Alex Dopico, Humana Press, 503-514, Cover Chapter (2007).
- C. D. Blanchette, **W.-C. Lin**, T. V. Ratto, and M. L. Longo, "Galactosylceramide Domain Microstructure: Impact of Cholesterol and Nucleation/Growth Conditions," *Biophysical Journal* **90**: 4466-4478 (2006).
- **W.-C. Lin**, C. D. Blanchette, T. V. Ratto, and M. L. Longo, "Lipid Asymmetry in DLPC/DSPC-Supported Lipid Bilayers: A Combined AFM and Fluorescence Microscopy Study," *Biophysical Journal* **90**: 228-237 (2006).
- C.-H. Lee, H.-Y. Mong, and **W.-C. Lin**, "Non-Interferometric Wide-Field Optical Profilometry with Nanometer Depth Resolution," *Optics Letters* **27,** 1773 (2002).
- C.-H. Lee, **W.-C. Lin**, and J. Wang, "All-Optical Measurements of the Bending Rigidity of Lipid-Vesicle Membranes across Structural Phase Transitions," *Physical Review E* **64,** 020901(R) (2001).
- C.-H. Lee, **W.-C. Lin**, and J. Wang, "Using Differential Confocal Microscopy to Detect the Phase Transition of Lipid Vesicle Membranes," *Optical Engineering* **40,** 2077 (2001).

PRESENTATIONS

Invited Presentations

- Seminar presentation at Institute of Physics, Academia Sinica, Taiwan, 2006.
  "Mimicking Leaflet Asymmetries and Lateral Heterogeneities in Plasma Membranes, a Supported Lipid Bilayer Study."
- Seminar presentation at Graduate Institute of Biophysics, National Central University, Taiwan, 2006.
  "Mimicking Leaflet Asymmetries and Lateral Heterogeneities in Plasma Membranes, a Supported Lipid Bilayer Study."

Abstracts and Presentations

- **W.-C. Lin**, C. D. Blanchette, and M. L. Longo, "Atomic Force Microscopy of Galactosylceramide Domains in Supported Lipid Bilayers Composed of Phospholipids and Cholesterol." Presented at *American Chemical Society Colloid and Surface Science Symposium*, 2006.
- C. D. Blanchette, **W.-C. Lin**, and M. L. Longo, "Nucleation and Growth of Symmetric and Asymmetric Solid Phase and Liquid-Ordered Phase Domains in Supported Lipid Bilayers." Presented at *American Chemical Society Colloid and Surface Science Symposium*, 2006.
- **W.-C. Lin**, C. D. Blanchette, and M. L. Longo, "Structure Mediated Multivalent Interaction between GalcCer Microdomains and Gp120, an HIV Envelope Protein, a

Supported Lipid Bilayer Study." Presented at *Biophysical Society Annual Meeting*, 2006.

- **W.-C. Lin**, C. D. Blanchette, and M. L. Longo, "Mimicking Nanometer-Scale Heterogeneity Using Gel-Liquid Coexisting Supported Lipid Bilayers." Presented at *Material Research Society Spring Meeting*, 2005.
- C. D. Blanchette, **W.-C. Lin**, T. V. Ratto and M. L. Longo, "Effects of Cholesterol on Galactosylceramide Domain Morphology and Membrane Binding Properties: a Combined Atomic Force Microscopy and Fluorescence Microscopy Study." Presented at *Material Research Society Spring Meeting*, 2005.
- **W.-C. Lin**, C. D. Blanchette, T. V. Ratto and M. L. Longo, "Transmembrane Coupling and Movement in Gel-Liquid Coexisting Supported Lipid Bilayers." Presented at *Biophysical Society Annual Meeting*, 2005.
- C. D. Blanchette, **W.-C. Lin**, T. V. Ratto and M. L. Longo, "Effects of Cholesterol on Galactosylceramide Domain Morphology and Membrane Binding Properties." Presented at *Biophysical Society Annual Meeting*, 2005.
- **W.-C. Lin**, C. D. Blanchette, and M. L. Longo, "Mimicking Nanometer-Scale Heterogeneity Using Gel-Liquid Coexisting Supported Lipid Bilayers." Presented at *American Chemical Society National Meeting*, 2005.
- C. D. Blanchette, **W.-C. Lin**, T. V. Ratto and M. L. Longo, "Cholesterols Ability to Modulate Galactosylceramide Domain Morphology and Binding Properties." Presented at *American Chemical Society National Meeting*, 2005.
- **W.-C. Lin**, C. D. Blanchette, and M. L. Longo, "Lipid Superposition and Transmembrane Movement in Gel-Liquid Coexisting Supported Lipid Bilayers, an AFM Study." Presented at *Biophysical Society Annual Meeting*, 2004.
- C. D. Blanchette, **W.-C. Lin**, and M. L. Longo, "Multivalent Interactions between Gp120, an HIV Envelope Glycoprotein, and Galactosylceramide (GalCer): A Combined Atomic Force Microscopy and Fluorescence Microscopy Study." Presented at *Biophysical Discussions: Probing Membrane Microdomains, 2004.*
- **W.-C. Lin**, C. D. Blanchette, and M. L. Longo, "Lipid Superposition and Transmembrane Movement in Gel-Liquid Coexisting Supported Lipid Bilayers, an AFM Study." Presented at *Biophysical Discussions: Probing Membrane Microdomains, 2004.*
- **W.-C. Lin** and M. L. Longo, "Glycosphingolipid Microdomains on Supported Lipid Bilayers, A Platform for Studying the Protein-Ligand Interaction Between HIV-1 Envelope Protein gp120 and Galactosyl Ceramide (GalCer)," Presented at *Center on Polymer Interfaces and Macromolecular Assemblies (CPIMA) Annual Forum*, 2003.
- C.-H. Lee and **W.-C. Lin**, "Non-Interferometric Wide-Field Optical Profilometry with Nanometer Depth Resolution." Presented at *Conference on Lasers and Electro-Optics,* 2002.
- C.-H. Lee, **W.-C. Lin**, and J. Wang, "Mechanical Aspects of Lipid-Bilayer Phase Transition Studied by Differential Confocal Microscopy." Presented at *Conference on Lasers and Electro-Optics,* 2001.

- C.-H. Lee, **W.-C. Lin**, and J. Wang, "Measuring the Bending Rigidity of Giant Unilamellar Liposomes with Differential Confocal Microscopy." Presented at *Conference on Lasers and Electro-Optics*, 2000.
- **W.-C. Lin**, C.-H. Lee, and J. Wang, "Using Differential Confocal Microscopy to Detect the Phase Transition of the Membranes of Giant Unilamellar Liposomes." Presented at *Photonics Taiwan*, 2000.

ACADEMIC SERVICE

Vice President, Student Association of College of Science, National Taiwan University, 1997-1999

Vice President, Student Association of Department of Physics, National Taiwan University, 1997-1998

PROFESSIONAL MEMBERSHIPS

- Biophysical Society
- American Chemical Society
- Materials Research Society