CURRICULUM VITAE
NANCY L. THOMPSON

Date: September 14, 2015

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EDUCATION:

Ph.D. Physics, University of Michigan, Ann Arbor, MI, 1982
B.S. Physics & Mathematics, Guilford College, Greensboro, NC, 1977

POSITIONS:

Department of Chemistry, University of North Carolina at Chapel Hill
Professor, 7/93-present
Associate Professor, 7/90-6/93
Assistant Professor, 7/85-6/90
Department of Chemistry, Stanford University
Damon Runyon - Walter Winchell Cancer Fund Postdoctoral Fellow, 10/82-6/85
Advisor: Harden M. McConnell
Department of Physics, University of Michigan at Ann Arbor
Graduate Research and Teaching Assistant, 9/77-9/82
Advisor: Daniel Axelrod

HONORS:

Fellow of the Biophysical Society, 2016
Fellow of the American Association for the Advancement of Science, 2014
Fellow of the American Physical Society, 2006
Alberta Heritage Foundation for Medical Research Invited Lecturer, 1999
Francis Stuart Chapin Professor, 1993-1996
Hettleman Prize, University of North Carolina, 1991
Faculty Award for Women in Science, National Science Foundation, 1991-1997
Alumni Excellence Award, Guilford College, 1991
Dreyfus Teacher-Scholar Award, 1990-1995
Margaret Oakley Dayhoff Award, Biophysical Society, 1989
Junior Faculty Development Award, University of North Carolina, 1989
Presidential Young Investigator Award, National Science Foundation, 1986-1991
Junior Faculty Award, E. I. Du Pont De Nemours & Co., 1986
Postdoctoral Fellowship, Damon Runyon - Walter Winchell Cancer Fund, 1982-1985

MEMBERSHIPS:

American Physical Society
American Association for the Advancement of Science
Biophysical Society
Society of Fluorescence

PAST AND CURRENT GRANT SUPPORT:

American Cancer Society
American Chemical Society Petroleum Research Fund
Dreyfus Foundation
Dupont Corporation
Glaxo-Wellcome, Inc.
National Institutes of Health
National Science Foundation
Newport Corporation
North Carolina Biotechnology Center
Zeiss Instruments

INVITED TALKS (recent):

Biophysical Society Thematic Meeting, Proteins on Surfaces, Proteins at Interfaces: Assembly, Activation and Signaling, Madrid, 10/15 (Co-organizer and Speaker)
Gordon Research Conference, Stochastic Physics in Biology, Ventura, 1/13 (Session Chair and Speaker)
Department of Chemistry, George Washington University, 3/12
Symposium on "Fluorescence Correlation Spectroscopy: Applications to Biophysics", National Meeting of the Biophysical Society, San Diego, 2/12 (Chair and Speaker)
Symposium on "Total Internal Reflection Fluorescence", National Microscopy and Microanalysis Meeting, Nashville, 8/11
Department of Chemistry and Biochemistry, East Carolina University, 2/10
Symposium on "Structure and Function of Membranes, Proteins and Lipids", National Meeting of the American Chemical Society, Salt Lake City, 3/09
Department of Microbiology and Immunology (CBTP Student Symposium), Univ. Michigan Ann Arbor, 4/08
Symposium on "Structure, Properties and Function of Cell Membrane and Membrane Related Biomolecules", National Meeting of the American Chemical Society, New Orleans, 4/08
Department of Chemistry, Pennsylvania State University, 3/08
Fluorescence Subgroup Meeting, Biophysical Society Annual Meeting, 2/08
10th Conference on Methods and Applications of Fluorescence: Spectroscopy, Imaging and Probes, Salzburg, 9/07
American Association of Physics Teachers Annual Meeting, 7/07
Department of Chemistry, University of Maryland, 4/07
Dept. Chemistry & Biochemistry, University of North Carolina at Wilmington, 3/07
American Chemical Society Minnesota Section Meeting, Minneapolis, 10/06
Symposium on "Physical Properties of Biological Membranes", National Meeting of the American Chemical Society, San Francisco, 9/06
National Institutes of Health Workshop, "Frontiers in Live Cell Imaging", 4/06
Symposium on "Interaction of Peptides and Proteins with Membrane Surfaces", National Meeting of the

American Chemical Society, Atlanta, 3/06
National Institutes of Health Workshop on Signaling Defects in Aging Immune Cells, 10/05
6th International Weber Symposium on Innovative Fluorescence Methodologies in Biochemistry and Medicine, Kauai, Hawaii, 7/05
Gordon Research Conference, Chemistry of Supramolecules and Assemblies, Maine, 6/05
37th Annual Oak Ridge Conference, Pushing the Technology Envelope II: An Exploration of the Future of Clinical Laboratory Testing, Baltimore, 4/05
Organizing Committee, Biophysical Discussion on Probing Membrane Microdomains, Asilomar, 10/04
Zeiss Symposium on Fluorescence Correlation Spectroscopy and Related Methods, Dresden, 10/04
FASEB Summer Conference on Molecular and Cellular Membranes, Tucson, 6/04
Membrane Structure and Assembly Subgroup Meeting, "Looking for Lipid Rafts", Biophysical Society Annual Meeting, 2/04
Department of Physics, University of South Florida, Tampa, 10/03
Department of Molecular Medicine, Oregon Health Sciences University, 10/03
Department of Neuronal Signaling and Cellular Biophysics, Max Planck Institute for Biophysical Chemistry, Goettingen, Germany, 9/03
8th Conference on Methods and Applications of Fluorescence: Spectroscopy, Imaging and Probes, Prague, 8/03
Workshop on Total Internal Reflection Fluorescence, Biomolecular Interaction Technologies Center (NSF Industry/University Cooperative Research Center), University of New Hampshire, 7/03 (2 day course)
Workshop on Quantifying Reversible Macromolecular Association, Biophysical Society Annual Meeting, San Antonio, 3/03
Symposium, Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Providence RI, 10/02
Department of Biochemistry, Duke University, 2/02
Department of Chemistry, University of Wisconsin, Madison, 11/01
Biophysics Research Division, University of Michigan, Ann Arbor, 4/01
Symposium on G-Protein Coupled Receptors, Pfizer, Boston, 10/00
Zeiss Symposium on Fluorescence Correlation Spectroscopy and Related Methods, St. Louis, 10/00
Department of Chemistry, Texas A&M University, 4/00
Gordon Conference on Reversible Associations in Structural and Molecular Biology, 2/00

PUBLICATIONS:

Liu P,** Wang X,** Itano MS, Neumann AK, Jacobson K,* Thompson NL* (2014) Low copy numbers of DC-SIGN in cell membrane microdomains: Implications for structure and function. *Traffic 15*, 176-196. **equal contributions; *equal contributions

Itano MS, Graus MS, Pehlke C, Wester MJ, Liu P, Lidke KA, Thompson NL,* Jacobson K,* Neumann AK* (2014) Super-resolution imaging of C-type lectin spatial rearrangement within the dendritic cell plasma membrane at fungal microbe contact sites. *Frontiers in Physics: Membrane Physiology and Membrane Biophysics*, Aug 12 doi: 10.3389/fphy.2014.00046 *equal contributions

Garcia-Parajo MF, Cambi A, Torreno-Pina JA, Thompson NL, Jacobson K (2014) Nanoclustering as a dominant motif in plasma membrane organization. *Journal of Cell Science 127*, 4995-5005.

Navaratnarajah P, Steele BL, Redinbo MR, Thompson NL (2012) Rifampicin - independent interactions between the pregnane X receptor ligand binding domain and peptide fragments of co-activator and co-repressor proteins. *Biochemistry 51*, 19-31.

Liu P, Wang X, Itano MS, Neumann AK, Jacobson K,* Thompson NL* (2012) The formation and stability of DC-SIGN microdomains require its extracellular moiety. *Traffic 13*, 715-726. *equal contributions

Itano MS, Steinhauer C, Schmied J, Forthmann C, Liu P, Neumann AK, Thompson NL,* Tinnefeld P,* Jacobson K* (2012) Super-resolution imaging of C-type lectin and influenza hemagglutinin nanodomains on plasma membranes using blink microscopy. *Biophysical Journal 102*, 1534-1542. *equal contributions

Thompson NL, Navaratnarajah P, Wang X (2011) Measuring surface binding thermodynamics and kinetics by using total internal reflection with fluorescence correlation spectroscopy: Practical considerations. *Journal of Physical Chemistry B 115*, 120-131

Itano MS, Neumann AK, Liu P, Zhang F, Gratton E, Parak WJ, Thompson NL,* Jacobson K* (2011) DC-SIGN and influenza hemagglutinin dynamics in plasma membrane microdomains are markedly different. *Biophysical Journal 100*, 2662-2670. *equal contributions

Slade KM, Steele BL, Pielak GJ, Thompson NL (2009) Quantifying green fluorescent protein diffusion in *Escherichia coli* by using continuous photobleaching with evanescent illumination. *Journal of Physical Chemistry B 113*, 4837-4845.

Thompson NL, Wang X, Navaratnarajah P (2009) Total internal reflection with fluorescence correlation spectroscopy: Applications to substrate-supported planar membranes. *Journal of Structural Biology 168*, 95-106.

Slade KM, Baker R, Chua M, Thompson NL, Pielak GJ (2009) Effects of recombinant protein expression on green fluorescent protein diffusion in *Escherichia coli*. *Biochemistry 48*, 5083-5089

Thompson NL, Navaratnarajah P, Wang X (2009) Total internal reflection with fluorescence correlation spectroscopy. *Reviews in Fluorescence 2009* (Geddes DC, Ed), Springer, 345-380.

Neumann AK, Thompson NL, Jacobson K (2008) Distribution and lateral mobility of DC-SIGN on immature dendritic cells: Implications for pathogen uptake. *Journal of Cell Science 121*, 634-643.

Gherghe CM, Mortimer SA, Krahn JM, Thompson NL, Weeks KM (2008) Slow conformational dynamics at C2'-endo nucleotides in RNA. *Journal of the American Chemical Society 130*, 8884-8885.

Thompson NL, Steele BL (2007) Total internal reflection with fluorescence correlation spectroscopy. *Nature Protocols* 2: 878-890.

Lagerholm BC, Weinreb GE, Jacobson K, Thompson NL (2006) Analysis method for measuring submicroscopic distances with blinking quantum dots. *Biophysical Journal* 91: 3050-3060.

Thompson NL, Pero JK (2006) Total internal reflection – fluorescence correlation spectroscopy, in *Reviews in Fluorescence Volume 3* (CD Geddes and JR Lakowicz, editors), Kluwer Academic / Plenum Publishers, 215-237

Pero JK, Haas EM, Thompson NL (2006) Size dependence of protein diffusion very close to membrane surfaces: Measurement by total internal reflection with fluorescence correlation spectroscopy. *Journal of Physical Chemistry* 110: 10910-10918

Allen NW, Thompson NL (2006) Ligand binding by estrogen receptor beta attached to nanospheres measured by fluorescence correlation spectroscopy. *Cytometry Part A 69A*: 524-532

Thompson NL, Pero JK (2005) Total internal reflection fluorescence microscopy: Applications in biophysics, in *Fluorescence Spectroscopy in Biology: Advanced Methods and Their Applications to Membranes, Proteins, DNA and Cells.* Springer Series on Fluorescence (Wolfbeis OS, series editor; Hof M, Hutterer R, Fidler V, volume editors), Springer-Verlag, 79-103

Lagerholm BC, Weinreb GE, Jacobson K, Thompson NL (2005) Detecting microdomains in intact cell membranes. *Annual Review of Physical Chemistry* 56: 309-336

Lieto AM, Thompson NL (2004) Total internal reflection with fluorescence correlation spectroscopy: Nonfluorescent competitors. *Biophysical Journal* 87: 1268-1278

Lieto AM, Lagerholm BC, Thompson NL (2003) Lateral diffusion from ligand dissociation and rebinding at surfaces. *Langmuir* 19: 1782-1787

Khan TK, Yang B, Thompson NL, Maekawa S, Epand RM, Jacobson KA (2003) Binding of NAP-22, a calmodulin-binding neuronal protein, to raft-like domains in model membranes. *Biochemistry* 42: 4780-4786

Lieto AM, Cush RR, Thompson NL (2003) Ligand-receptor kinetics measured by total internal reflection with fluorescence correlation spectroscopy. *Biophysical Journal* 85: 3294-3302

Starr TE, Thompson NL (2002) Local diffusion and concentration of IgG near planar membranes: Measurement by total internal reflection with fluorescence correlation spectroscopy, *Journal of Physical Chemistry B* 106: 2365-2371

Starr TE, Thompson NL (2002) Fluorescence pattern photobleaching recovery for samples with multi-component diffusion. *Biophysical Chemistry 97:* 29-44

Thompson NL, Lieto AM, Allen NW (2002) Recent advances in fluorescence correlation spectroscopy. *Current Opinion in Structural Biology* 12: 634-641

Dietrich C, Bagatolli L, Volovyk ZN, Thompson NL, Levi M, Jacobson KA, Gratton E (2001) Lipid rafts reconstituted in model membranes. *Biophysical Journal* 80: 1417-1428

Starr TE, Thompson NL (2001) Total internal reflection with fluorescence correlation spectroscopy: Combined surface reaction and solution diffusion. *Biophysical Journal 80*: 1575-1584

Thompson NL, Mitchell JL (2001) High order autocorrelation in fluorescence correlation spectroscopy. In *Fluorescence Correlation Spectroscopy: Theory and Applications* (Rigler R, Elson EL, editors) Springer-Verlag, 438-458

Dietrich C, Volovyk ZN, Levi M, Thompson NL, Jacobson KA (2001) Partitioning of Thy-1, GM1 and cross-linked phospholipid analogs into lipid rafts reconstituted in model membranes. *Proc. Natl. Acad. Sci. U.S.A. 98:* 10642-10647

Lagerholm BC, Thompson NL (2000) Temporal dependence of ligand dissociation and rebinding at cell membrane surfaces. *Journal of Physical Chemistry* 104: 863-868

Lagerholm BC, Starr TE, Volovyk ZN, Thompson NL (2000) Rebinding of IgE Fabs at haptenated planar membranes: Measurement by total internal reflection with fluorescence photobleaching recovery. *Biochemistry* 39: 2042-2051

Cai YC, Bullard JM, Thompson NL, Spremulli LL (2000) Interaction of mitochondrial elongation factor Tu with elongation factor Ts and aminoacyl-tRNA. *Journal of Biological Chemistry* 275: 20308-20314

Cai YC, Bullard JM, Thompson NL, Spremulli LL (2000) Interaction of mitochondrial elongation factor Tu with guanine nucleotides. *Protein Science* 9: 1791-1800

Starr TE, Thompson NL (2000) Formation and characterization of planar phospholipid bilayers supported on TiO_2 and $SrTiO_3$ single crystals. *Langmuir 16*: 10301-10308

Chen L, Pielak GJ, Thompson NL (1999) The cytoplasmic region of mouse FcγRIIb1, but not FcγRIIb2, binds to phospholipid membranes. *Biochemistry* 38: 2102-2109

Vanden Broek W, Huang Z, Thompson NL (1999) High order autocorrelation with imaging fluorescence correlation spectroscopy: Application to IgE on supported planar membranes. *Journal of Fluorescence* 9: 313-324

Lagerholm BC, Thompson NL (1998) Theory for ligand rebinding at cell membrane surfaces. *Biophysical Journal* 74: 1215-1228

Thompson NL, Drake AW, Chen L, Vanden Broek W (1997) Equilibrium, kinetics, diffusion and self-association of proteins at planar membrane surfaces: Measurement by total internal reflection fluorescence microscopy. *Photochemistry and Photobiology* 65: 39-46

Goldsmith EB, Erickson BW, Thompson NL (1997) Synthetic peptides from mouse Fc receptor (moFcγRII) that alter the binding of IgG to moFcγRII. *Biochemistry* 36: 952-959

Thompson NL, Lagerholm BC (1997) Total internal reflection fluorescence: Applications in cellular biophysics. *Current Opinion in Biotechnology* 8: 58-64

Chen L, Thompson NL, Pielak GJ (1997) Design, synthesis, expression, and characterization of the genes for mouse FcγRIIb1 and FcγRIIb2 cytoplasmic regions. *Protein Science* 6: 1038-1046

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Sheets ED, Chen L, Thompson NL (1997) Decreased IgG - FcγRII dissociation kinetics in the presence of a protein antigen. *Molecular Immunology* 34: 519-526

Huang Z, Thompson NL (1996) Imaging fluorescence correlation spectroscopy: Nonuniform IgE distributions on planar membranes. *Biophysical Journal* 70: 2001-2007

Vanden Broek W, Thompson NL (1996) When bivalent proteins might walk across cell surfaces. *Journal of Physical Chemistry* 100: 11471-11479

Hsieh HV, Thompson NL (1995) Dissociation kinetics between a mouse Fc receptor (FcγRII) and IgG: Measurement by total internal reflection with fluorescence photobleaching recovery. *Biochemistry* 34: 12481-12488

Thompson NL, Huang Z, Gesty D, Bowles EC (1995) Dynamics of proteins on planar model membranes: Measurement by total internal reflection fluorescence microscopy. In *Current Topics in Biophysics Volume 3: Biophysics of Organized Lipid Membranes for Applications in Chemical Analysis* (Krull UJ, Nikolelis DP, editors) Iasi Press: 292-311

Hsieh HV, Thompson NL (1994) Theory for measuring bivalent surface binding kinetics using total internal reflection with fluorescence photobleaching recovery. *Biophysical Journal* 66: 898-911

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Huang Z, Thompson NL (1993) Theory for two-photon excitation in pattern photobleaching with evanescent illumination. *Biophysical Chemistry* 47: 241-249

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Thompson NL, Pearce KH, Hsieh HV (1993) Total internal reflection fluorescence microscopy: Application to substrate-supported planar membranes. *Eur. Biophysical Journal* 22: 367-378

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Engel M, Pisarchick ML, Thompson NL, Erickson BW (1992) Binding of a coiled-coil protein to planar membranes measured by total internal reflection fluorescence microscopy. In *Peptides: Chemistry and Biology, Proc. 12th American Peptide Symposium* (Smith JA, River JE, editors) ESCOM: 464-465

Pisarchick ML, Gesty D, Thompson NL (1992) Binding kinetics of an anti-dinitrophenyl monoclonal Fab on supported phospholipid monolayers measured by total internal reflection with fluorescence photobleaching recovery. *Biophysical Journal* 63: 215-223

Pearce KH, Hiskey RG, Thompson NL (1992) Surface binding kinetics of prothrombin fragment 1 on planar membranes measured by total internal reflection fluorescence microscopy. *Biochemistry* 31: 5983-5995

Huang Z, Pearce KH, Thompson NL (1992) Effect of bovine prothrombin fragment 1 on the translational diffusion of phospholipids in Langmuir-Blodgett monolayers. *Biochimica et Biophysica Acta* 1112: 259-265

Hsieh HV, Poglitsch CL, Thompson NL (1992) Direct measurement of the weak interactions between a mouse Fc receptor (FcγRII) and IgG1 in the absence and presence of hapten: A total internal reflection fluorescence microscopy study. *Biochemistry* 31: 11562-11566

Timbs MM, Poglitsch CL, Pisarchick ML, Sumner MT, Thompson NL (1991) Binding and mobility of anti-dinitrophenyl monoclonal antibodies on fluid-like Langmuir-Blodgett phospholipid monolayers containing dinitrophenyl-conjugated phospholipids. *Biochimica et Biophysica Acta* 1064: 219-228

Poglitsch CL, Sumner MT, Thompson NL (1991) Binding of IgG to moFcγRII purified and reconstituted into supported planar membranes as measured by total internal reflection fluorescence microscopy. *Biochemistry* 30: 6662-6671

Tendian SW, Lentz BR, Thompson NL (1991) Evidence from total internal reflection fluorescence microscopy for calcium-independent binding of prothrombin to negatively charged phospholipid membranes. *Biochemistry* 30: 10991-10999

Thompson NL, Pisarchick ML, Poglitsch CL, Timbs MM, Sumner MT, Hsieh HV (1991) Transport, equilibrium and kinetics of antibodies on planar model membranes measured by quantitative fluorescence microscopy. In *Progress in Membrane Technology* (Gomez-Fernandez JC, Chapman D, Packer L, editors) Birkhauser Verlag, Basel: 83-97

Thompson NL (1991) Fluorescence correlation spectroscopy. In *Topics in Fluorescence Spectroscopy Volume 1* (Lakowicz JR, editor) Plenum Press: 337-378

Poglitsch CL, Thompson NL (1990) Interaction of antibodies with Fc receptors in substrate-supported planar membranes measured by total internal reflection fluorescence microscopy. *Biochemistry* 29: 248-254

Poglitsch CL, Thompson NL (1990) Substrate-supported planar membranes containing murine antibody Fc receptors: A total internal reflection fluorescence microscopy study. In *Biosensor Technology: Fundamentals and Applications* (R. P. Buck, W. E. Hatfield, M. Umana, and E. Bowden, editors) Marcel Dekker, New York: 375-382

Timbs MM, Thompson NL (1990) Slow rotational mobilities of antibodies and lipids associated with substrate-supported phospholipid monolayers as measured by polarized fluorescence photobleaching recovery. *Biophysical Journal* 58: 413-428

Pisarchick ML, Thompson NL (1990) Binding of a monoclonal antibody and its Fab fragment to supported phospholipid monolayers measured by total internal reflection fluorescence microscopy. *Biophysical Journal* 58: 1235-1249

Palmer AG, Thompson NL (1989) Intensity dependence of high-order autocorrelation functions in fluorescence correlation spectroscopy. *Review of Scientific Instruments* 60: 624-633

Palmer AG, Thompson NL (1989) Optical spatial intensity profiles for high order autocorrelation in fluorescence spectroscopy. *Applied Optics* 28: 1214-1220

Wright LL, Palmer AG, Thompson NL (1989) Concentration dependence of the translational diffusion of monoclonal antibodies specifically bound to phospholipid Langmuir-Blodgett films. In *Biomedical Materials and Devices, Proc. Materials Research Society 110*: 419-424

Palmer AG, Thompson NL (1989) Fluorescence correlation spectroscopy for detecting submicroscopic clusters of fluorescent molecules in membranes. *Chemistry and Physics of Lipids* 50: 253-270

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Wright LL, Palmer AG, Thompson NL (1988) Inhomogeneous translational diffusion of monoclonal antibodies on phospholipid Langmuir-Blodgett films. *Biophysical Journal* 54: 463-470

Thompson NL, Palmer AG, Wright LL, Scarborough PE (1988) Fluorescence techniques for supported planar membranes. *Comments on Molecular and Cellular Biophysics* 5: 109-131

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Burghardt TP, Thompson NL (1985) Model-independent electron spin resonance for measuring order of immobile components in a biological assembly. *Biophysical Journal* 48: 401-409

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Thompson NL, Brian AA, McConnell HM (1984) Covalent linkage of a synthetic peptide to a fluorescent phospholipid and its incorporation into supported phospholipid monolayers. *Biochimica et Biophysica Acta* 772: 10-19

Burghardt TP, Thompson NL (1984) Effect of planar dielectric interfaces on fluorescence emission and detection: Evanescent excitation with high-aperture collection. *Biophysical Journal* 46: 729-737

Thompson NL, McConnell HM, Burghardt TP (1984) Order in supported phospholipid monolayers detected by the dichroism of fluorescence excited by polarized evanescent illumination. *Biophysical Journal* 46: 739-747

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Thompson NL, Burghardt TP, Axelrod D (1981) Measuring surface dynamics of biomolecules by total internal reflection fluorescence with photobleaching recovery or correlation spectroscopy. *Biophysical Journal* 33: 435-454

Thompson NL, Axelrod D (1980) Reduced lateral mobility of a fluorescent lipid probe in cholesterol-depleted erythrocyte membrane. *Biochimica et Biophysica Acta* 597: 155-165