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**Professional Preparation**

2004-2006	Postdoc, Molecular Biology	Northwestern University; Advisor: Prof. Jonathan Widom
2002-2004	Postdoc, Biophysics,	Université Louis Pasteur; Advisor: Dr. Didier Chatenay
2002	Ph.D., Physics,	University of Illinois, Chicago; Advisor: Prof. John F. Marko
1997	M.S., Physics	University of Illinois, Chicago
1995	B.S., Physics	Truman State University

**Appointments**

2008-present Adjunct Assistant Professor, Department of Biochemistry, The Ohio State University.  
 2006-present Faculty Member of the Ohio State University Biochemistry Graduate Program.  
 2006-present Faculty Member of the Ohio State University Biophysics Graduate Program.  
 2006-present Assistant Professor, Department of Physics, The Ohio State University.  
 2004-2006 Postdoctoral Fellow, Department of Biochemistry, Molecular Biology and Cell Biology, Northwestern University.  
 2002-2004 Postdoctoral Researcher, Laboratoire de Dynamique des Fluides Complexes, Université Louis Pasteur.  
 1997-2002 Research Assistant, Department of Physics, University of Illinois, Chicago.  
 1995-1997 Teaching Assistant, Department of Physics, University of Illinois, Chicago.

**Honors**

2005 Burroughs Wellcome Fund Career Award in Basic Biomedical Sciences  
 2004 Ruth L. Kirschstein National Research Service Award, Individual Fellowship, National Institutes of Health.  
 2003 Postdoctoral Award from Le Centre National de Recherche Scientifique, France.  
 2002 Postdoctoral Award from Le Ministre de la Recherche, France.  
 1994 Dr. Robert Peavler Memorial Endowed Physics Scholarship.  
 1991-1995 Truman State University President's Honorary and Combined Scholarship.

**Publications**

1. M.G. Poirier, E. Oh, H. Tims, and J. Widom (2009) Dynamics and function of compact nucleosome arrays. *Nat Struct Mol Bio*. In Press.
2. M. Manohar, A.M. Mooney, J.A. North, R.J. Nakkula, J.W. Picking, A. Edon, R. Fishel, M.G. Poirier and J.J. Ottesen (2009) Acetylation of histone H3 at the nucleosome dyad alters DNA-histone binding. *J Biol Chem*. Jun 11.
3. R.A. Forties, R. Bundschuh, M.G. Poirier (2009) The flexibility of locally melted DNA. *Nucleic Acids Res*. May 31.
4. H.M. Shen, M.G. Poirier, M.J. Allen, J. North, R. Lai, J. Widom, U. Storb (2009) The Activation Induced Cytidine Deaminase (AID) Efficiently Targets DNA in Nucleosomes, But Only During Transcription. *J Exp Med*. May 11;206(5):1057-71
5. M.G. Poirier, M. Bussiek, J. Langowski, J. Widom (2008) Spontaneous access to DNA target sites in folded chromatin fibers. *J Mol Biol*. Jun 13;379(4):772-86.
6. M.G. Poirier and J.F. Marko, Micromechanical studies of mitotic chromosomes. (2003) *Curr Top Dev Biol*. 55:75-141.
7. M.G. Poirier and J.F. Marko, Micromechanics of chromatin and chromosomes (2003) *Biochem Cell Biol*. Jun;81(3):209-20.
8. M.G. Poirier and J.F. Marko, Micromechanical properties of mitotic chromosomes. (2003) *J Musc Res Cell Motil*. 23, 409-431.

9. M.G. Poirier and J.F. Marko, Mitotic chromosomes are chromatin networks without an internal protein scaffold. (2002) *Proc Natl Acad Sci USA* 99, 15393-15397.  
Commented on by Belmont, A. (2002) *Proc Natl Acad Sci U S A*. 99, 15855-7.
10. A. Sarkar, S. Eroglu, M.G. Poirier, A. Nemani, P. Gupta and J.F. Marko, Dynamics of chromosome compaction during mitosis, *Exp Cell Res*. (2002) Jul 1;277(1):48-56.
11. M.G. Poirier and J.F. Marko, Effect of internal friction on biofilament dynamics (2002) *Phys Rev Lett*. 88(22):228103.
12. M.G. Poirier, S. Eroglu and J.F. Marko, The bending rigidity of mitotic chromosomes (2002) *Mol Biol Cell*. 13:2170-2179.
13. M.G. Poirier, T. Monhait and J.F. Marko, Reversible hypercondensation and decondensation of mitotic chromosomes studied using combined chemical-micromechanical techniques. (2002) *J Cell Biochem*. 85:422-424.
14. M.G. Poirier, A. Nemani, P. Gupta, S. Eroglu and J.F. Marko, Probing chromosome structure with dynamic force relaxation (2001) *Phys Rev Lett*. 86, 360-363.
15. M. Poirier, S. Eroglu, D. Chatenay, and J.F. Marko, Reversible and irreversible unfolding of mitotic newt chromosomes by applied force (2000) *Mol Biol Cell*. 11, 269-276.

#### Submitted Manuscripts

1. S. Javid, M. Manohar, N. Punja, A. Mooney, J.J.Ottesen, M.G. Poirier, and R. Fishel, Nucleosome remodeling catalyzed by hMSH2-hMSH6. Submitted to *Mol Cell*.
2. J. Wong, M.G. Poirier, D. Chatenay, and J. Robert. Plasmid copy number noise in monoclonal populations of bacteria. Submitted to *Phys Rev E*.

#### Invited Presentations

1. Seminar Presenter. Facilitating a Novel DNA Mismatch Repair Function with Histone Post-Translational Modifications. Presented at The Physics Colloquium. Institut de Physique et Chimie des Matériaux de Strasbourg. Strasbourg, France. June, 2009.
2. Seminar Presenter. Histone posttranslational modifications buried in the nucleosome dyad facilitate nucleosome disassembly and repositioning. Presented at The American Chemical Society Annual Meeting. August, 2009.
3. Seminar Presenter. Connecting Chemical and Physical Alterations to DNA Organization. Presented at The Department of Physics Colloquium. University of Illinois, Chicago. Chicago, IL. April 2009.
4. Seminar Presenter. How Histone Post-Translational Modifications Function When They Are Buried Under DNA. Presented at The Department of Molecular Virology, Immunology and Medical Genetics Seminar. Columbus, Ohio. December, 2008.
5. Discussant. The Physics of Genome folding and Function. Presented at Lorentz Workshop. Leiden, The Netherlands. October, 2008.
6. Poster Presenter. Molecular Mechanisms of Histone Modifications within the Nucleosomal DNA-histone Interface. Presented at The Burroughs Wellcome Fund Career Awardees' Summer Conference. Dana Point, California. June, 2007.
7. Seminar Presenter. Understanding How Wrapped DNA Is Biologically Active. Presented at of Biochemistry Seminar. The Ohio State University. Columbus, OH. April 2007.
8. Seminar Presenter. Dynamics of Nucleosome Arrays. Presented at The Midwest Microscopy Microanalysis Society. March, 2007.
9. Seminar Presenter. Accessibility and Structure within Nucleosome Arrays. Presented at The American Physical Society March Meeting. March, 2007.
10. Seminar Presenter. Understanding How Wrapped DNA is Biologically Active. Presented at The Department of Biochemistry Seminar. The Ohio State University. Columbus, OH. April, 2007.
11. Seminar Presenter. Accessibility and Structure within Nucleosome Arrays. Presented at The Asia and Pacific Workshop on Biological Physics. National University of Singapore. Singapore. July, 2006.
12. Seminar Presenter. Chromosome Architecture, Mechanics and Function. Presented at The Department of Physics Colloquium. Brandeis University. Waltham, MA. January, 2005.
13. Seminar Presenter. Chromosome Architecture, Mechanics and Function. Presented at The Department of Physics Colloquium. University of Texas, Austin. Austin, TX. January, 2005.

14. Seminar Presenter. Chromosome Architecture, Mechanics and Function. Presented at The Department of Physics Colloquium. University of Arizona. Tucson, AZ. January, 2005.
15. Seminar Presenter. Chromosome Architecture, Mechanics and Function. Presented at The Department of Physics Colloquium. The Ohio State University. Columbus, OH. December, 2004.
16. Seminar Presenter. Two Examples of Mesoscopic Properties Within Biological Systems. Presented at The Department of Physics Colloquium. Indiana University. Bloomington, IN. April, 2004.
17. Seminar Presenter. Combining Elasticity and Biochemistry to Study Mitotic Chromosome Structure. Presented at The International Symposium on Chromosome Research at the Nano-Era. Osaka University. December, 2003.
18. Seminar Presenter. Two Examples of Mesoscopic Properties Within Biological Systems. Presented at The Laboratoire de Physique des Solides Seminar. Université Paris-Sud. Paris, France. November, 2003.
19. Seminar Presenter. Two Examples of Mesoscopic Properties Within Biological Systems. Presented at The Department of Physics Colloquium. University of Illinois, Urbana-Champaign. Champaign, IL. September, 2003.

## Research Support.

### Ongoing Research Support

- 02/01/2009-01/31/2010                      National Science Foundation  
Seed Funding from The Center for Emergent Materials, an NSF funded Materials Research Science and Engineering Center,  
“Heterogeneous Magnetic Particles for Force and Torque Sensing: A New Approach for Single Molecule Biology.”  
Principal Investigator: Michael G Poirier  
Amount Funded: \$49,125  
Goal: This project will develop new magnetic nanoparticles for single molecule torque measurements.
- 07/01/2008-06/30/2010                      American Heart Association  
“A study of the molecular mechanisms by which histone modifications in the nucleosome dyad symmetry axis function.”  
Principal Investigator: Michael G Poirier  
Amount Funded: \$42,000 plus tuition waiver  
Goal: Provide Pre-doctoral training for Mr. Justin North, a second year graduate student working in my laboratory.
- 02/01/2008-03/31/2013                      National Institutes of Health, R01 GM083055  
“Characterization of Four Histone H3 Modifications in the DNA-Histone Interface.”  
Principal investigator: Michael G Poirier  
Amount Funded: \$1,425,000  
Goal: This project aims to investigate the function of post-translational modifications in the DNA-histone interface of the nucleosome with biochemical and biophysical experiments.
- 09/01/2005 - 08/31/2013                      Burroughs Wellcome Fund, Career Award in Basic Biomedical Research  
“A study of DNA accessibility within nucleosome arrays.”  
Principal investigator: Michael G Poirier  
Amount Funded: \$457,960  
Goal: This award funds the person not a specific project.

### Pending Research Support

- 04/01/2010 – 03/31/2016                      National Science Foundation  
“CAREER: The Structure and Function of Holliday Junctions and Meiotic MutS Homologs within Chromatin.”  
Principle Investigator: Michael Poirier  
Requested Funding: \$633,235  
Goal: Determine the structure and dynamics of a Holliday Junction embedded in a nucleosome array and how it is regulated by the MutS homolog, MSH4-MSH5.

09/30/2009-09/29/2011 National Institutes of Health, Grand Opportunity Grant  
"The Biological Physics of Complex Chromatin in Cancer: a multidisciplinary group."  
Principal Investigator: Richard Fishel  
Requested Funding: \$2,178,743  
Role: Co-Investigator  
Goal: This proposal will incorporate innovative biophysical, chemical, and mathematical modeling technologies to construct and characterize, clusters of engineered histone modifications (Modification Modules) that affect cancer prognosis.

09/01/2009-08/31/2011 National Institute of Health, RFA-CA-09-009  
"Physics and Engineering of Microevolution in Cancer Metastasis"  
Principal Investigator: Michael Paulaitis  
Revised Requested Funding: \$2,335,711  
Role: Co-Investigator and Unit Co-Leader: Project 2  
Goal: This project aims to understand the dynamical and physical properties of chromatin and chromosomes that are diagnostic of sequence-driven (mismatch repair) and aneuploidy-driven genomic instability that ultimately drives tumorigenesis.

### Teaching

PHYS 111: Mechanics and Heat, Fall 2007, Winter 2008.

PHYS 780: Introduction to Biophysics, Spring 2008, Spring 2009.

PHYS 594/294: Introduction to Nanoscience, Winter 2008, Winter 2009.

### Advised Personnel

*Graduate Students:* Robert Forties (Physics, 2007-present); Thomas Haver (Biophysics, 2008-present); Alex Mooney (Physics, 2008-present); Justin North (Physics, 2007-present); Marek Simon (Physics, 2006-present); Morgan Welsh (Physics, 2009-present).

*Postdoctoral Researcher:* Paula Vivas (Physics, 2009-present)

*Research Associate:* Robin Nakkula (Biochemistry & Biophysics, 2006-present)

### Service

1. *Minority Outreach:* Hosted 5 minority physics undergraduate students and successfully recruited 1 minority student to become a graduate student in the Department of Physics at OSU (2007-2009).
2. *Undergraduate mentoring:* Mentored a total of 7 undergraduates in the past 3 years. 5 of which are conducting research projects during the summer 2009.
3. *Course Development:* Developing a new course on nano- and biotechnology to expose undergraduates in the colleges of biological sciences, physical sciences and engineering to new collaborative science. 2006-2009.
4. *Peer-Reviewer for International Journals and Funding Agencies:* Adhoc reviewer for the National Institutes of Health and the French National Research Agency, ANR (Agence Nationale de la Recherche). Reviewed manuscripts for Biophysical Journal, Journal of Molecular Biology and FEBS Letters.
5. *Biological Physics Seminar:* Hosted 15 interdisciplinary seminar speakers on the OSU campus from 2006 to 2009.
6. *International Meetings:* Chaired sessions at the American Physical Society March meeting and the American Chemical Society Annual Meeting.