Michael Guy Poirier

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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

2020 – present	Chair, Department of Physics, the Ohio State University
2018	Visiting Scholar, Institut de Génétique et de Biologie Moléculaire et Cellulaire, Illkirch-Graffenstaden, France
2016 – present	Professor, Department of Physics, the Ohio State University
2016 – present	Professor (by courtesy), Department of Chemistry & Biochemistry, the Ohio State University
2012 – 2016	Associate Professor, Department of Physics, the Ohio State University
2012 – 2016	Associate Professor (by courtesy), Department of Chemistry & Biochemistry, the Ohio State University
2009 – 2012	Assistant Professor (by courtesy), Department of Molecular Virology, Immunology and Medical Genetics, The Ohio State University Medical Center.
2008 – 2012	Assistant Professor (by courtesy), Department of Biochemistry, The Ohio State University.
2006 – 2012	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

2020	Elizabeth L. Gross Award
2020	Lumley Interdisciplinary Research Award

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.

Publications

Summary: 58 publications; 29 corresponding author publications*; 11 first author publications; 2812 citations; h-index 29, i10-index 48. (Stats from Google Scholar.)

58. Zhao D, Le JV, Darcy MA, Crocker K, **Poirier MG**, Castro CE, Bundschuh R. Quantitative modeling of nucleosomes unwrapping from both ends. *Biophy. J.* 2019 Oct 30. pii: S0006-3495(19)30880-X. doi: 10.1016/j.bpj.2019.09.048.

57. Klein BJ, Cox KL, Jang SM, Côté J, **Poirier MG**, Kutateladze TG. Molecular Basis for the PZP Domain of BRPF1 Association with Chromatin. Structure. 2019 Nov 6. pii: S0969-2126(19)30355-7. doi: 10.1016/j.str.2019.10.014.

56. Johnson JA, Dehankar A, Robbins A, Kabtiyal P, Jergens E, Lee KH, Johnston-Halperin E, **Poirier M**, Castro CE, Winter JO. The path towards functional nanoparticle-DNA origami composites. *Mat Sci Eng R.* 2019 Oct;138:153-209. doi: 10.1016/j.mser.2019.06.003.

55. Donovan BT, Huynh A, Ball DA, **Poirier MG**, Larson DR, Ferguson ML, Lenstra TL. Single-molecule imaging reveals the interplay between transcription factors, nucleosomes, and transcriptional bursting. *EMBO J.* 2019 May 17; e100809. doi: 10.15252/embj.2018100809.

54. Brehove M, Shatoff E, Donovan BT, Jipa CM, Bundschuh R, **Poirier MG***. DNA sequence influences hexasome orientation to regulate DNA accessibility. *Nucleic Acids Res.* 2019 Jun 20;47(11):5617-5633. doi: 10.1093/nar/gkz272.

53. Donovan BT, Chen H, Jipa CM, Bai L, **Poirier MG***. Dissociation rate compensation mechanism for budding yeast pioneer transcription factors. *eLIFE*. 2019 Mar 19;8. pii: e43008. doi: 10.7554/eLife.43008.

52. Zhang Y, Klein BJ, Cox KL, Bertulat B, Tencer AH, Holden MR, Wright GM, Black J, Cardoso MC, **Poirier MG** and Kutateladze TG. The mechanism for autoinhibition and activation of the MORC3 ATPase. *Proc. Nat. Acad. Sci, (USA)*. 2019 Mar 8. pii: 201819524. doi: 10.1073/pnas.1819524116.

51. Fierz B*, **Poirier MG***. Biophysics of chromatin dynamics. *Annu Rev Biophys.* 2019 Mar 18. doi: 10.1146/annurev-biophys-070317-032847.

50. Bhat S, Hwang Y, Gibson MD, Morgan MT, Taverna SD, Zhao Y, Wolberger C, **Poirier MG***, Cole PA*. Hydrazide Mimics for Protein Lysine Acylation To Assess Nucleosome Dynamics and Deubiquitinase Action. *J Am Chem Soc.* 2018 Aug 1;140(30):9478-9485. doi: 10.1021/jacs.8b03572.

49. Gatchalian J, Wang X, Ikebe J, Cox KL, Tencer AH, Zhang Y, Burge NL, Di L, Gibson MD, Musselman CA, **Poirier MG**, Kono H, Hayes JJ and Kutateladze TG. Accessibility of the histone H3 tail in the nucleosome for binding of paired readers. *Nature Comm.* 2017 Nov 14;8(1):1489.

48. Tencer AH, Cox KL, Di L, Bridgers JB, Lyu J, Wang X, Sims JK, Weaver TM, Allen HF, Zhang Y, Gatchalian J, Darcy MA, Gibson MD, Ikebe J, Li W, Wade PA, Hayes JJ, Strahl BD, Kono H, **Poirier MG***, Musselman CA* and Kutateladze TG*. Covalent modifications of histone H3K9 promote binding of CHD3. *Scientific Reports*. 2017 Oct 10;21(2):455-466.

47. Willy NM, Ferguson JP, Huber SD, Heidotting SP, Aygün E, Wurm SA, Johnston-Halperin E, **Poirier MG**, Kural C. Membrane mechanics govern spatiotemporal heterogeneity of endocytic clathrin coat dynamics. *Mol Biol Cell*. 2017 Sep 13. pii: mbc.E17-05-0282. doi: 10.1091/mbc.E17-05-0282.

46. Hudoba MW, Luo Y, Zacharias A, **Poirier MG***, Castro CE*. Dynamic DNA Origami Device for Measuring Compressive Depletion Forces. *ACS Nano.* 2017 Jul 25;11(7):6566-6573. doi: 10.1021/acsnano.6b07097.

45. Gibson MD, Gatchalian J, Slater A, Kutateladze TG, **Poirier MG***. PHF1 Tudor and N-terminal domains synergistically target partially unwrapped nucleosomes to increase DNA accessibility. *Nucleic Acids Res.* 2017 Apr 20;45(7):3767-3776.

44. Gibson MD, Brehove M, Luo Y, North J, **Poirier MG***. Methods for Investigating DNA Accessibility with Single Nucleosomes. *Methods in Enzymology*. 2016;581:379-415.

43. Le JV, Luo Y, Darcy M, Lucas C, Goodwin M, **Poirier MG***, Castro CE*. Probing nucleosome stability with a DNA origami nanocaliper. *ACS Nano* 2016. Jul 26;10(7):7073-84.

42. Teeling-Smith RM, Jung YW, Scozzaro N, Cardellino J, Rampersaud I, North JA, Šimon M, Bhallamudi VP, Rampersaud A, Johnston-Halperin E*, **Poirier MG***, Hammel PC*. NV center electron paramagnetic resonance of a single nanodiamond attached to an individual biomolecule. *Biophy. J.* 2016. May 10;110(9):2044-52.

41. Bhallamudi VP, Xue R, Purser CM, Banasavadi-Siddegowda YK, Kaur B, Hammel PC, **Poirier MG**, Lannutti JJ, Pandian RP. Nanofiber-based paramagnetic probes for rabip, real-time biomedical oximetry. *Biomedical Microdevices*. 2016. Apr;18(2):38.

40. Wike CL, Graves HK, Hawkins R, Gibson MD, Ferdinand MB, Zhang T, Chen Z, Hudson DF, Ottesen JJ, **Poirier MG**, Schumacher J, Tyler JK. Aurora-A mediated histone H3 phosphorylation of threonine 118 controls condensin I and cohesin occupancy in mitosis. *eLIFE* 2016;10.7554/eLife.11402.

39. Klein BJ, Muthurajan UM, Lalonde ME, Gibson MD, Andrews FH, Hepler M, Machida S, Yan K, Kurumizaka H, **Poirier MG**, Côté J, Luger K, Kutateladze TG. Bivalent interaction of the PZP domain of BRPF1 with the nucleosome impacts chromatin dynamics and acetylation. *Nucleic Acids Res* 2016 Jan 8;44(1):472-84.

38. Bernier M, Luo Y, Nwokelo KC, Goodwin M, Dreher SJ, Zhang P, Parthun MR, Fondufe-Mittendorf Y, Ottesen JJ, **Poirier MG***. Linker histone H1 and H3K56 acetylation are antagonistic regulators of nucleosome dynamics. *Nature Comm.* 2015 Dec 9;6:10152. doi: 10.1038/ncomms10152.

37. Chatterjee N, North JA, Dechassa ML, Manohar M, Prasad R, Luger K, Ottesen JJ, **Poirier MG,** Bartholomew B. Histone Acetylation near the nucleosome dyad axis enhances nucleosome disassembly by RSC and SWI/SNF. *Mol Cell Biol.* 2015 Dec 1;35(23):4083-92. doi: 10.1128/MCB.00441-15.

36. Brehove M, Wang T, North J, Luo Y, Dreher SJ, Shimko JC, Ottesen JJ, Luger K, **Poirier MG***. Histone core phosphorylation regulates DNA accessibility. *J. Biol. Chem.* 2015 Sep

11;290(37):22612-21

35. Bowman GD*, **Poirier MG***. Post-translational modifications of histones that influence nucleosome dynamics. *Chem Rev.* 2015 Mar 25;115(6):2274-95.

34. Luo Y, North JA, **Poirier MG***. Single molecule fluorescence methodologies for investigating transcription factor binding kinetics to nucleosomes and DNA. *Methods*. 2014 Oct 7. pii: S1046-2023(14)00317-X. doi: 10.1016/j.ymeth.2014.09.011.

33. North JA, Šimon M, Ferdinand MB, Shoffner MA, Picking JW, Howard CJ, Mooney AM, van Noort J, **Poirier MG***, Ottesen JJ*. Histone H3 phosphorylation near the nucleosome dyad alters chromatin structure. *Nucleic Acids Res.* 2014 Apr;42(8):4922-33. doi:10.1093/nar/gku150.

32. Luo Y, North JA, Rose SD and **Poirier MG** *. Nucleosomes Accelerate Transcription Factor Dissociation. *Nucleic Acids Res*. 2014 Mar;42(5):3017-27. doi: 10.1093/nar/gkt1319.

31. Musselman CA, Gibson MD, Hartwick EW, North JA, Gatchalian J, **Poirier MG**, and Kutateladze TG. Binding of PHF1 Tudor to H3K36me3 enhances nucleosome accessibility. *Nature Comm.* 2013 Dec 19;4:2969. doi: 10.1038/ncomms3969.

30. Gao M, Nadaud PS, Bernier MW, North JA, Hammel PC, **Poirier MG***, Jaroniec CP*. Flexible histone tails in large nucleosome arrays probed by magic angle spinning NMR spectroscopy. *J Am Chem Soc.* 2013 Oct 16;135(41):15278-81.

29. North JA, Amunugama R, Klajner M, Bruns AN, **Poirier MG***, Fishel R*. ATP-dependent nucleosome unwrapping catalyzed by human RAD51. *Nucleic Acids Res.* 2013 Aug 1;41(15):7302-12.

28. Law YK, Forties RA, Liu X, **Poirier MG**, Kohler B. Sequence-dependent thymine dimer formation and photoreversal rates in double-stranded DNA. *Photochem Photobiol Sci.* 2013 Aug;12(8):1431-9.

27. Eidahl JO, Crowe BL, North JA, McKee CJ, Shkriabai N, Feng L, Plumb M, Graham RL, Gorelick RJ, Hess S, **Poirier MG**, Foster MP, Kvaratskhelia M. Structural basis for high-affinity binding of LEDGF PWWP to mononucleosomes. *Nucleic Acids Res.* 2013 Apr 1;41(6):3924-36.

26. Sen P, Vivas P, Dechassa, ML, Mooney AM, **Poirier MG** and Bartholomew B. The SnAC domain of SWI/SNF is a histone anchor required for remodeling. *Mol Cell Biol.* 2013 Jan; 33(2):360-70.

25. Shimko JC, Howard CJ, **Poirier MG** and Ottesen JJ "The Preparation of Semisynthetic and Fully Synthetic Histones H3 and H4 to Introduce Modifications in the Nucleosome Core", *Methods Mol. Biol.* 2013;981:177-92.

24. North JA, Shimko JC, Javaid S, Mooney AM, Shoffner MA, Rose SD, Bundschuh R, Fishel R, Ottesen JJ, **Poirier MG***. Regulation of the nucleosome unwrapping rate controls DNA accessibility. *Nucleic Acids Res* 2012 Nov 1;40(20):10215-27.

23. Kodgire P, Mukkawar P, North JA, **Poirier MG**, Storb U. Nucleosome stability dramatically impacts the targeting of somatic hypermutation. *Mol Cell Biol.* 2012 May;32(10):2030-40.

22. Chen A, Vieira G, Henighan T, Howdyshell M, North JA, Hauser AJ, Yang FY, **Poirier MG**, Jayaprakash C and Sooryakumar R. Regulating Brownian Fluctuations with Tunable Microscopic Magnetic Traps. *Phys Rev Lett.* 2011 Aug. 18; 107(8): 87206.

21. Simon M., North JA, Shimko JC, Forties RA, Ferdinand MA, Manohar M, Zhang M, Fishel R, Ottesen JJ and **Poirier MG***. Histone Fold Modifications Control Nucleosome

Unwrapping and Disassembly. *Proc. Nat. Acad. Sci, (USA)*. 2011 Aug 2;108(31):12711-6.

20. Forties RA, North JA, Javaid S, Tabba OP, Fishel R, **Poirier MG** and Bundschuh R. A Quantitative Model of Nucleosome Dynamics. *Nucleic Acids Res*. 2011 Oct;39(19):8306-13.

19. North JA, Javaid S, Ferdinand MB, Chatterjee N, Picking JW, Shoffner M, Nakkula RJ, Bartholomew B, Ottesen JJ, Fishel, **Poirier MG***. Phosphorylation of Histone H3(T118) Alters Nucleosome Dynamics and Remodeling. *Nucleic Acids Res*. 2011 Aug; 39(15): 6465-74.

18. Shimko JC, North JA, **Poirier MG*** and Ottesen JJ*. Preparation of fully synthetic histone H3 reveals that acetyl-lysine 56 facilitates protein binding within nucleosomes. *J Mol Biol.* 2011 Apr 29; 408(2): 187-204.

17. Wong J, **Poirier MG**, Chatenay D and Robert J. Plasmid copy number noise in monoclonal populations of bacteria. *Phys Rev E*. 2010 Jan;81(1 Pt 1):011909..

16. Javaid S, Manohar M, Punja N, Mooney A, Ottesen JJ, **Poirier MG***, and Fishel R. Nucleosome remodeling by hMSH2-hMSH6. *Mol Cell.* 2009 Dec 24;36(6):1086-94.

15. **Poirier MG***, Oh E, Tims H, and Widom J*. Dynamics and function of compact nucleosome arrays. *Nat Struct Mol Bio.* 2009 Sep;16(9):938-44.

14. Manohar M, Mooney AM, North JA, Nakkula RJ, Picking JW, Edon A, Fishel R, **Poirier MG*** and Ottesen JJ Acetylation of histone H3 at the nucleosome dyad alters DNA-histone binding. *J Biol Chem.* 2009 Aug 28;284(35):23312-21.

13. Forties RA, Bundschuh R, **Poirier MG*** The flexibility of locally melted DNA. *Nucleic Acids Res.* 2009 Aug;37(14):4580-6.

12. Shen HM, **Poirier MG**, Allen MJ, North J, Lai R, Widom J, Storb U The Activation Induced Cytidine Deaminase (AID) efficiently targets DNA in nucleosomes, but only during transcription. *J Exp. Med.* 2009 May 11;206(5):1057-71.

11. **Poirier MG**, Bussiek M, Langowski J, Widom J Spontaneous access to DNA target sites in folded chromatin fibers. *J Mol Biol.* 2008 Jun 13;379(4):772-86.

10. **Poirier MG** and Marko JF, Micromechanical studies of mitotic chromosomes. *Curr Top Dev Biol.* 2003, 55:75-141.

9. **Poirier MG** and Marko JF, Micromechanics of chromatin and chromosomes *Biochem Cell Biol.* 2003 Jun;81(3):209-20.

8. **Poirier MG** and Marko JF, Micromechanical properties of mitotic chromosomes. *J Musc Res Cell Motil.* 2003, 23, 409-431.

7. **Poirier MG** and Marko JF, Mitotic chromosomes are chromatin networks without an internal protein scaffold. *Proc Natl Acad Sci USA* 2002 Nov 26; 99, 15393-15397.

   Commented on by Belmont, A. 2002 *Proc Natl Acad Sci U S A.* 2002 Nov 26; 99, 15855-7.

6. Sarkar A, Eroglu S, **Poirier MG**, Nemani A, Gupta P and Marko JF, Dynamics of chromosome compaction during mitosis, *Exp Cell Res.* 2002 Jul 1;277(1):48-56.

5. **Poirier MG** and Marko JF, Effect of internal friction on biofilament dynamics *Phys Rev Lett.* 2002 Jun 3; 88(22):228103.

4. **Poirier MG***, Eroglu S and Marko JF, The bending rigidity of mitotic chromosomes *Mol Biol Cell.* 2002 Jun 13: (6):2170-2179.

3. **Poirier MG***, Monhait T and Marko JF, Reversible hypercondensation and decondensation of mitotic chromosomes studied using combined chemical-micromechanical techniques. *J Cell Biochem.* 2002; 85:422-424.

2. **Poirier MG***, Nemani A, Gupta P, Eroglu S and Marko JF, Probing chromosome structure with dynamic force relaxation *Phys Rev Lett.* 2001 Jan 8; 86, 360-363.

1. **Poirier M**, Eroglu S, Chatenay D, and Marko JF, Reversible and irreversible unfolding of mitotic newt chromosomes by applied force *Mol Biol Cell.* 200 Jan; 11, 269-276.

Invited Presentations

Summary**:** 64 invited talks; includes talks at a Gordon Conference, Keystone Symposia, the ACS national meeting, the ASBMB National Meeting, the Annual Biophysical Society Meeting and the APS March meeting.

64. Strategies transcription factors use to gain access to inaccessible DNA. APS March meeting, Denver CO, March 2020. Cancelled due to Covid-19.

63. Understanding how pioneer factors circumvent nucleosomes, Presented at the Alpine Single Molecule Meeting, Les Houches, France, Feb. 2020.

62. Strategies transcription factors use to gain access to “inaccessible” DNA, Presented at the Department of Biological Chemistry seminar series, University of Michigan, Ann Arbor, Michigan, Dec 2019.

61. The physics of the human genome, Presented at the Physics Colloquium, Case Western University, Cleveland OH, Oct. 2019.

60. Strategies transcription factors use to gain access to “inaccessible” DNA, University of Colorado, Denver Campus, Denver, Colorado, May 2019.

59. Strategies transcription factors use to gain access to “inaccessible” DNA, University of Colorado, Medical School, Denver, Colorado, May 2019.

58. Understanding the coupling between nucleosome and transcription factor dynamics, Presented at the Sorbonne, Paris, France, June 2018.

57. Understanding the coupling between nucleosome and transcription factor dynamics, Presented at the Netherland Cancer Institute, Amsterdam, Netherlands, June 2018.

56. Understanding the coupling between nucleosome and transcription factor dynamics. Presented at the Institut Génétique et de Biologie Moléculaire et Cellulaire, Strasbourg, France, May, 2018.

55. Nucleosome and Pioneer Factor Interactions, Single Molecule Alpine Meeting, Chamonix, France, March, 2018.

54. Deconstructing Nucleosome Dynamics, Presented at the Biochemistry Seminar, SUNY, Buffalo, NY, Nov. 2017

53. Deconstructing Nucleosome Dynamics, Presented at the Molecular Biology Seminar, Brandeis University, Watham, MA, Oct. 2017

52. Epigenetic Regulation of Nucleosome Dynamics. Presented at the Annual Biophysical Society Meeting. New Orleans, LA, 02/2017.

51. Epigenetic Regulation of Nucleosome Dynamics. Presented at the École Polytechnique Fédération de Lausanne, Lausanne, Switzerland, 01/2017.

50. Epigenetic Regulation of Nucleosome Dynamics. Presented at the Institut Génétique et de Biologie Moléculaire et Cellulaire, Strasbourg, France, 01/2017.

49. Dynamic Sensing at the Nanoscale with DNA. Presented at the Physics Colloquium, Iowa State University, Ames, IA, 10/2016.

48. Epigenetic Regulation of Nucleosome Dynamics. Presented at the Telluride Workshop on Chromatin Structure and Dynamics, Telluride, CO, August, 2016.

47. Dynamic sensing at the nanoscale with DNA nanotechnology Presented at the Biophysics Seminar, University of Minnesota, Minneapolis, MN, 05/2016.

46. Dynamic sensing at the nanoscale with DNA nanotechnology. Presented at the Biophysics Seminar, Georgia Institute of Technology, Atlanta GA, 01/2016.

45. Dynamic Consequences of DNA-Protein Binding within Chromatin. Presented at the Molecular Biology and Biochemistry Seminar, University of Iowa Medical School, Iowa City, IA, 12/2015.

44. Dynamics DNA Origami Sensors for Probing Molecular Forces and Chromatin Dynamics, Japan Atomic Energy Agency, Kyoto, Japan, 08/2015.

43. Regulators of Nucleosome Dynamics. Presented at the International Symposium on chromatin Structure, Dynamics and Function, Awaji Yumebutai International Conference Center, Awaji Japan, 08/2015.

42. Functions of Chromatin Dynamics. Presented at the Department of Biochemistry and Molecular Biology Seminar Series. Colorado State University, Fort Collins, CO, 01/2015.

41. The Mechanics of the Human Genome. Presented at the Department of Physics Colloquium. Kent State University, Kent, OH, 01/2015.

40. Functions of Chromatin Dynamics, Presented at The Raymond and Beverly Sackler Institute Seminar Series, Yale University, New Haven, CT 12/2014.

39. The Mechanics of the Human Genome, Presented at the Department of Physics Colloquium, University of Missouri, Columbia, MO, 10/2014.

38. Functions of Chromatin Dynamics. Presented at the Department of Biochemistry and Molecular Biology Seminar Series, Washington University, St. Louis MO, 09/2014.

37. Regulation of Nucleosome Unwrapping Dynamics. Presented at the Telluride Workshop on Chromatin Structure and Dynamics, Telluride, CO, August, 2014.

36. Nucleosomes Dramatically Accelerate Transcription Factor Dissociation. Presented at the Single Molecule Approaches to Biology Gordon Conference. Lucca, Italy, July, 2014.

35. Regulatory Mechanisms of Nucleosome Dynamics. Presented at the International Symposium on Laser and Computational Biophysics, Normal East China University, Shanghai, China, June, 2014.

34. Transcription Factor Binding Dynamics within Chromatin. Presented at the Department of Molecular Genetic, Biochemistry and Microbiology Seminar Series. University of Cincinnati, Cincinnati OH, June, 2014.

33. Mechanics of the Human Genome. Presented at the Department of Physics Colloquium. Indiana University - Purdue University Indianapolis, Indianapolis, Indiana, April, 2014.

32. Regulation and Function of Nucleosome Dynamics, Presented at Department of Pharmacy Seminar Series, University of Colorado Medical School, Denver, CO, November, 2013.

31. Transcription factor binding dynamics within chromatin. Presented at NCI seminar series. National Institutes of Health, National Cancer Institute. Bethesda MD, May, 2013.

30. Single Molecule Studies of Transcription Factor Occupancy within Nucleosomes. Presented at the Telluride Workshop on Chromatin Structure and Dynamics, Telluride, CO, August, 2012.

29. Mechanics of the Human Genome. Presented at the Ohio Section of the American Physical Society, Columbus OH, April, 2012.

28. Regulation of Nucleosome Dynamics. Presented at the Biochemistry Seminar Series. Colorado State University, Fort Collins, CO, April, 2012.

27. Unlocking Nucleosome Dynamics with Histone Post-Translational Modifications. Presented at the Biophysical Society, Dynamic DNA Packaging Across Kingdoms: Chromatin and Beyond, Asilomar, CA, July, 2011.

26. Unlocking Nucleosome Dynamics with Histone Post-Translational Modifications. Presented at the Biochemistry Seminar Series. Brigham Young University, Provo, UT, April, 2011.

25. Unlocking Nucleosome Dynamics with Histone Post-Translational Modifications. Presented at the American Society of Biochemistry and Molecular Biology, Washington, D.C. April, 2011.

24. Unlocking Nucleosome Dynamics with Histone Post-Translational Modifications. Presented at the American Physical Society March Meeting, Dallas, TX, March 2011.

23. Unlocking Nucleosome Dynamics with Histone Post-Translational Modifications. Presented at the Keystone Meeting, Histone Code: Fact or Fiction, Midway Utah, Jan 2011.

22. Unlocking Nucleosome Dynamics with Histone Post-Translational Modifications. Presented at the Biochemistry Seminar Series. University of Illinois, Urbana-Champaign, IL, September 2010.

21. Unlocking Nucleosome Dynamics and Remodeling with Histone Post-Translational Modifications. Presented at the Midwest Single Molecule Meeting. Washington University, St. Louis, MO, July 2010.

20. Unlocking Nucleosome Dynamics and Remodeling with Histone Post-Translational Modifications. Presented at the Cornell Biophysics Colloquia series. Cornell University, Ithaca, NY, April 2010.

19. Histone Post-Translational Modifications Buried in the Nucleosome Dyad Facilitate Nucleosome Disassembly and Repositioning. Presented at The American Chemical Society Annual Meeting. August, 2009.

18. 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.

17. Connecting Chemical and Physical Alterations to DNA Organization. Presented at The Department of Physics Colloquium. University of Illinois, Chicago. Chicago, IL. April 2009.

16. 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.

15. The Physics of Genome Folding and Function. Presented at Lorentz Workshop. Leiden, The Netherlands. October, 2008.

14. Molecular Mechanisms of Histone Modifications within the Nucleosomal DNA-Histone Interface. Presented a poster at The Burroughs Wellcome Fund Career Awardees' Summer Conference. Dana Point, California. June, 2007.

13. Understanding How Wrapped DNA is Biologically Active. Presented at of Biochemistry Seminar. The Ohio State University. Columbus, OH. April 2007.

12. Dynamics of Nucleosome Arrays. Presented at The Midwest Microscopy Microanalysis Society. March, 2007.

11. Accessibility and Structure within Nucleosome Arrays. Presented at The American Physical Society March Meeting. March, 2007.

10. Understanding How Wrapped DNA is Biologically Active. Presented at The Department of Biochemistry Seminar. The Ohio State Universtiy. Columbus, OH. April, 2007.

9. Accessibility and Structure within Nucleosome Arrays. Presented at The Asia and Pacific Workshop on Biological Physics. National University of Singapore. Singapore. July, 2006.

8. Chromosome Architecture, Mechanics and Function. Presented at The Department of Physics Colloquium. Brandeis University. Waltham, MA. January, 2005.

7. Chromosome Architecture, Mechanics and Function. Presented at The Department of Physics Colloquium. University of Texas, Austin. Austin, TX. January, 2005.

6. Chromosome Architecture, Mechanics and Function. Presented at The Department of Physics Colloquium. University of Arizona. Tucson, AZ. January, 2005.

5. Chromosome Architecture, Mechanics and Function. Presented at The Department of Physics Colloquium. The Ohio State University. Columbus, OH. December, 2004.

4. Two Examples of Mesoscopic Properties within Biological Systems. Presented at The Department of Physics Colloquium. Indiana University. Bloomington, IN. April, 2004.

3. 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.

2. Two Examples of Mesoscopic Properties within Biological Systems. Presented at The Laboratoire de Physique des Solides Seminar. Université Paris-Sud. Paris, France. November, 2003.

1. 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

Current

03/17/2020-02/29/2025 **National Institutes of Health, R01** R01AI153216
"RNA binding and packaging by retroviral Gag proteins."
Principle Investigator: Karin Musier-Forsyth

Goal: Elucidate the mechanism by which transcriptional start site choice modulates gRNA packaging selectivity. More broadly, we will gain insights into how subtle sequence changes can alter the ensemble of 5′UTR RNA structures and impact viral replication fitness.
Role: Co-Investigator

03/15/2020-03/14/2023 **Department of Energy, 225749**
"Reciprocal energy exchange in hierarchical DNA origami-nanoparticle composites**"**
Principle Investigator: Jessica Winter
Goal: Explore fundamental principles of the physical and thermal interactions between complex DNA structures and energy responsive nanomaterials.
Role: Co-PI

09/01/2019 – 08/31/2023 **National Science Foundation, 193334**
"EFRI CEE: DNA origami tools to engineer chromatin structure and function in live cells."
Principle Investigator: Carlos Castro
Goal: Develop DNA origami nanodevices for targeting and manipulating chromatin in live cells.
Role: Co- Principle Investigator

10/01/2019 – 09/30/2023 **National Science Foundation 1921881**
"DMREF: Collaborative Research: DNA-based sensing, communicating and phase-separating materials"
Principle Investigator: Carlos Castro
Goal: Develop DNA origami materials with sensing, communicating and cooperative functionalities.
Role: Co-Principle Investigator

02/01/2019-01/31/2023 **National Institutes of Health, R01 GM131626**
"Understanding How Two Related Mammalian Histone Acetyl Transferase Co-activators, SAGA and ATAC, Differentially Regulate Chromatin Dynamics and Transcription."
Principle Investigator: Michael G Poirier
Goal: Investigate how the transcription co-activators, SAGA and ATAC, target chromatin properties through their accessory proteins to dynamically influence chromatin dynamics and accessibility.
Role: Principle Investigator

09/01/2017-08/31/2019 **National Institutes of Health, R01 GM123743**
"Structural and dynamic studies of histone tails in chromatin by magnetic resonance spectroscopy."
Principle Investigators; Chris Jaroniec & Michael G Poirier
Goal: Determine with SSNMR the influence of post translational modifications and histone readers on histone tail dynamics to regulate chromatin compaction and function.
Role: Multi Principle Investigator

08/01/2017-07/31/2020 **National Science Foundation, 1715321**
"Mechanistic studies of heterocrhomatin mesoscale structural dynamics with DNA origami nanotechnology."
Principal investigator: Michael G Poirier
Goal: Develop DNA origami nanostructures for investigating heterochromatin mesoscale structural dynamics.
Role: Principal Investigator

02/01/2017-01/31/2021 **National Institutes of Health, R01 GM121966**

"Regulatory mechanisms of linker histones and their post-translational modifications."
Principle investigator: Michael G Poirier
Goal: Determine the mechanisms by which linker histone isoforms and their post-translational modifications regulate chromatin function.
Role: Principle Investigator

02/01/2017-01/31/2021 **National Institutes of Health, R01 GM121858**

"Mechanistic Studies of Pioneer Factors."
Principle investigator: Lu Bai
Goal: Determine the mechanisms by which pioneer factors interact with chromatin and induce nucleosome disassembly.
Role: Co-Investigator

10/01/2016-09/30/2020 **National Institutes of Health, R01 GM120582**

"Dissecting functional cooperation among subunits in a catalytic ribonucleoprotein."
Principle Investigator: Venkat Goplan
Goal: Determine the structural dynamics that occurs within RNaseP and its protein subunits so that it can recognize and process tRNAs.
Role: Co-Investigator

Completed

05/01/2015-04/30/2020 **National Institutes of Health, R01 ES024478**

"The roles of chromatin structure and epigenetic changes in arsenic induced gene expression."
Principal investigator: Yvonne Fondufe-Mittendorf
Goal: Determine the impact of arsenic on chromatin regulation of gene expression.
Role: Co-Investigator

03/15/2017-03/14/2020 **Department of Energy, 225749**

"Exploring Fundamental Properties of Dynamic DNA Origami-Nanoparticle Composites"
Principle Investigator: Jessica Winter
Goal: Explore fundamental principles of the physical and thermal interactions between complex DNA structures and energy responsive nanomaterials.
Role: Co- Principle Investigator

10/01/2016-09/30/2018 **National Institutes of Health, R01 GM118664**

"Structural and dynamic studies of histone tails in chromatin by magnetic resonance spectroscopy."
Principle Investigator; Chris Jaroniec
Goal: Determine the influence of histone tail dynamics on chromatin compaction and function.
Role: Co-Investigator

02/01/2008-04/30/2018 **National Institutes of Health, R01 GM083055**

"Mechanisms of chromatin transcriptional regulation."
Principal investigator: Michael G Poirier
Goal: Determine the mechanisms by which histone variants, PTMs, chaperones and chromatin remodeling complexes function together to cooperatively, anti-cooperatively and redundantly regulate transcription.
Role: Principal Investigator

08/01/2015-07/31/2017 **National Science Foundation, 1516979**

"Chromatin structural dynamics studies with DNA origami nanotechnology."
Principal investigator: Michael G Poirier
Goal: Develop DNA origami nanostructures for investigating mesoscale structural dynamics.
Role: Principal Investigator

04/01/2013-03/31/2016 **National Institutes of Health, R21 CA174583**
"Nanoscale tools for functional studies of cancer-relevant chromatin modifications"
Principle Investigator: Carlos Castro
Goal: Develop DNA origami nanostructures to detect multiple histone post translational modifications within single nucleosomes.
Role: Co-Investigator

09/01/2010-08/31/2014 **National Science Foundation**
Proto-IRG Funding from The Center for Emergent Materials, an NSF funded Materials Research Science and Engineering Center,
"Magnetic Resonance Studies of Chromatin Structure and Dynamics."
Principal Investigator: Michael G Poirier
Goal: Determine chromatin material properties with magnetic resonance studies.
Role: Principal Investigator

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
Goal: This award funds the person not a specific project.
Role: Principal Investigator

01/01/2011-12/31/2013 **Ohio State University Pelotonia Fellowship**
"A study of the molecular mechanism by which human Rad51 and MSH2/MSH6 clear their own path for DNA repair."
Principal Investigator: Michael G Poirier
Goal: Provide Pre-doctoral training for Mr. Justin North, a second year graduate student working in my laboratory.
Role: Advisor

07/01/2010-06/30/2012 **American Heart Association**
"A study of the influence of histone core post translational modifications on nucleosome positioning."
Principal Investigator: Michael G Poirier
Goal: Provide Pre-doctoral training for Mr. Alex Mooney, a second year graduate student working in my laboratory.
Role: Advisor

02/01/2009-01/31/2011 **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
Goal: Develop new magnetic nanoparticles for single molecule torque measurements.
Role: Principal Investigator

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
Goal: Provide Pre-doctoral training for Mr. Justin North, a second year graduate student working in my laboratory.
Role: Advisor

Teaching

Summary: Taught 20 undergraduate level and 8 graduate level physics courses.

PHYS 5600	Thermal Physics, Fall 2019
PHYS 6809	Introduction to Biophysics, Fall 2013, Fall 2014, Fall 2017, Fall 2018
PHYS 1250	Mechanics, Thermal Physics and Waves, Fall 2012, Spring 2014, Spring 2015, Fall 2015 (2 sections), Fall 2016 (2 sections), Spring 2017, Spring 2020.
PHYS 111	Mechanics and Heat, Fall 2007, Winter 2008, Fall 2010 (2 sections), Fall 2011 (2 sections), Winter 2012.
PHYS 780	Introduction to Biophysics, Spring 2008, Spring 2009, Spring 2010. Spring 2011.
PHYS 594/294	Introduction to Nanoscience, Winter 2008, Winter 2009, Winter 2010 Winter 2011.

Advised Personnel

Summary: Advised 15 graduate students (9 have graduated with a Ph.D.; 5 current graduate students), 1 postdoc, 1 research technician, 2 research scientists and 31 undergraduate students

Graduate Students:

Marek Simon	(Physics, 2006-2012), Ph.D. in Physics, Presidential fellowship; postdoctoral fellow with Wolfgang Fischle, Max Planck Institute for Biophysical Chemistry. Currently a Research Scientist at ASK Chemicals
Robert Forties	(Physics, 2007-2011), Ph.D. in Physics, NSF predoctoral fellowship; postdoctoral fellow with Michelle Wang, HHMI Investigator, Cornell University
Justin North	(Physics, 2007-2012), Ph.D. in Physics, AHA predoctoral fellowship; Pelatonia fellowship; postdoctoral fellow with Robert Tabita, Dept. of Microbiology, Ohio State University.
Alex Mooney	(Physics, 2008-2012), Ph. D. in Physics, AHA predoctoral fellowship; Software design leader at Epic; Now a project manager at CoverMyMeds.
Morgan Welsh	(Physics, 2009-2015), Ph.D. in Physics, Financial analyst, Chase Bank.
Yi Luo	(Biophysics, 2010-2016), Ph.D. in Biophysics, postdoc with William Shih, Harvard University. Currently a research scientist at Illumina.
Omar Tabbaa	(Physics, 2010-2011)
Matthew Brehove	(Physics, 2011-2016), Ph.D. in Physics. Post doc with Tijana Talisman, City of Hope Hospital.
Matthew Gibson	(Physics, 2012-2016), Ph.D. in Physics, Technology Development Module and Integration Yield Engineer. Intel.

Ben Donovan	(Biophysics, 2015-2020), Ph.D. in Biophysics, Awarded a Cellular, Molecular and Biochemistry NIH T32 fellowship. Postdoctoral researcher at the NIH in Bethesda MD.
Michael Darcy	(Physics, 2015-present)
Khan Cox	(Physics, 2016-present)
Ariel Wurm	(Biophysics, 2016-present)
Kevin Jamison	(Physics, 2017-present)
Nathanial Burge	(Biochemistry, 2017-present) Awarded a Cellular, Molecular and Biochemistry NIH T32 fellowship.
Zhiyuan Meng	(Biophysics, 2020-present)
Kristin Chesnutt	(Biochemistry, 2020-present)

Undergraduate Students:

Joseph Wayman	2007 - 2008; Graduate school, Chemical and Biomedical Engineering, Cornell University
Jonathan Picking	2008 - 2010; Graduate school, Ohio State Biochemistry Program, The Ohio State University, awarded a Summer Undergraduate Research Fellowship. Co-authored 3 papers from the Poirier lab.
Matthew Shoffner	2008 – 2011; Research technician, The Ohio State Medical School. Co-authored 3 papers from the Poirier lab.
Liana Bonano	2008 - 2009
Malcolm McCauley	2009 - 2010
Shayne Reichard	2009 - 2010
Malika Randeria	2009, summer
Megan Segbers	2010, summer; REU student, Xavier University
Aaron Bruns	2009 – 2011; Graduate school, Ohio State Biochemistry Program, The Ohio State University. Co-authored 1 paper from the Poirier lab.
Sean Rose	2010-2013; Graduate school, Medical Physics, University of Chicago. Co-authored 2 papers from the Poirier lab.
Amelia Heston	2010-2012; Medical School, Ohio University
Gino Pace	2011-2012
Kimberly DiMauro	2011-2012
Andrew Slater	2012-2013, Medical School, Ohio University, co-authored 1 paper from the Poirier lab.
Alan Scott Hutchinson	2012-2013, Academic year REU student, Columbus State Univ
Kingsley Nwokelo	2013-2014, Academic year REU student.
Jillian Zhang	2013-2014
Gaurav Shastri	2013-2014, Department of Physics summer research fellowship
Chatondra Williams	2014-2015, Medical School, University of Alabama.
Michelle Goodwin	2014-2016, Co-authored 2 papers from the Poirier lab.
Ariel Wurm	2014-2016, awarded a URO Undergraduate Summer Research Fellowship. co-authored 1 paper from the Poirier lab.
Michelle Scott	2015-2017, Dental School at OSU, awarded a URO Undergraduate Summer Research Fellowship.
Catherine Mendel	2015-2016, Academic year REU student, Columbus State Univ
Shefali Ferguson	2016
Caroline Jipa	2016-present, Co-authored 2 papers from the Poirier lab, awarded a 2017 URO Undergraduate Summer Research Fellowship, awarded a Goldwater Fellowship.
Tom Sinha	2017
Wesley Terrill	2017-2018, Department of Physics 2018 summer research fellowship

Stephen Forster	2017
Jenna Thuma	2018-present, Department of Physics 2019 summer research fellowship
Danielle Bingman	2019-present, Department of Physics 2019 summer research fellowship
Alea Leganik	2020

Postdoctoral Researcher:

Paula Vivas (PhD, University of Illinois, Chicago) 2009 – 2013, Moved to postdoc in the Ohio State University Medical School. Currently a research scientist at ASK Chemicals

Golbarg Mohammadiroozbahani (PhD, Illinois Institute of Technology), 2020-Current.

Wolfgang Pfeifer (PhD, University of Duisburg-Essen), 2020-Current.

Research Technician:

Carter Mason	2017-present

Research Associate:

Robin Nakkula	2006 – 2010, Research associate in the Ohio State University Medical School
Pandian Ramasamy	2014 – 2015, Scientist in Ricerca Biosciences

Service and Professional Memberships

2002-present	Reviewer: Biochemistry, Biophysical Journal, Chromosoma, Epigenetics and Chromatin, FEBS Letters, JACS, Journal of Molecular Biology, JoVE, Nature Communications, Nature Reviews Molecular and Cellular Biology, Nature Structural and Molecular Biology, Nucleic Acids Research, Physical Review E, Plos One, PNAS, Science, Virology.
2006-present	Faculty Member, Ohio State Biochemistry Program, the Ohio State University
2006-present	Faculty Member, Biophysics Graduate Program, the Ohio State University
2006-present	*Course Development:* Developed 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.
2007-present	*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. Helped develop an APS funded bridge program to help students from under represented groups successfully apply to graduate school in Physics and complete a PhD degree.
2007-present	*International Meetings:* Chaired sessions at the American Physical Society March meeting and the American Chemical Society Annual Meeting.
2008	Reviewer for l'Agence Nationale de la Recherche
2009	Reviewer for NIH Challenge Grants
2011-present	Faculty Trainer, Cellular, Molecular and Biochemical Sciences Training Program, OSU
2011	Adhoc editor, PLOS Computational Biology
2011	Reviewer for MRC New Investigator Research Grants

2012-2015	External advisory board member for P01-GM088409
2012	Reviewer for the NSF, Chemistry, Chemistry of Life Processes.
2012	Ad hoc reviewer for NIH K99/R00
2013	Ad hoc reviewer for the NIH Pioneer Awards
2013	Ad hoc member of NIH Study Section for ES12-006 (R21) and ES12-007(R01)
2013-2023	Editorial Board Member, Journal of Biological Chemistry
2014	Reviewer for NSF, MCB, Molecular Biophysics.
2014	Ad hoc member of Molecular Genetics A NIH Study Section
2014	Ad hoc member of Molecular Structure and Function C Study Section
2014	Faculty representative on an OSU STEM Scholars Float Trip.
2015	Ad hoc member of Molecular Genetics A NIH Study Section
2015	Reviewer for the NSF, MCB, Genetic Mechanisms
2016-present	Faculty Trainer, Molecular Biophysics Training Program, OSU
2016	Ad hoc member of Molecular Genetics A NIH Study Section
2016-2020	Member of Molecular Genetic A NIH Study Section
2017	Reviewer for KAUST Grants.
2018	Reviewer for the NSF, MCB, Genetic Mechanisms
2020-present	Member of the OSU Center for RNA Biology