DAVID SWIGON

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Primary Appointment

- Assistant Professor, Department of Mathematics, University of Pittsburgh, 2004 – present

Education

- Ph. D., Theoretical Mechanics, January 1999
  Rutgers University, Piscataway, NJ.
  Dissertation: Configurations with Self-Contact in the Theory of the Elastic Rod Model for DNA; advisor Prof. B. D. Coleman
- M.S., Theoretical Mechanics, May 1995
  Rutgers University, Piscataway, NJ.
- Mgr. in Applied Mathematics (equivalent of M.S.), May 1993
  Charles University, Prague, Czech Republic

Secondary and Past Appointments

- Assistant Professor, Department of Computational Biology, University of Pittsburgh, 2006 – present
- Affiliate Member, Center for Inflammation and Regenerative Modeling, McGowan Institute for Regenerative Medicine, University of Pittsburgh, 2005 – present
- Associate Member, BioMaPS Institute, Rutgers University, 2002 – 2004
- Post-Doctoral Research Associate, Department of Chemistry, Rutgers University, Wilma Olson's Group, 2001 – 2004
- Post-Doctoral Associate, Department of Mechanics & Materials Science, Rutgers University, Bernard Coleman's Group, 1999 – 2001

Awards

- Alfred P. Sloan Research Fellowship, 2006
- Stanley and Francine Mandeles Graduate Research Award for outstanding research contributions to biophysical chemistry, Rutgers University, 1999
- Fellowship by the Program in Mathematics and Molecular Biology, sponsored by the Burroughs Wellcome Fund Interfaces Program, 1997 – 99
- Excellence Fellowship, Rutgers University, 1994 – 96

Grants

- HFSP grant : *Quantitative analysis of the DNA loop-domain model for long range regulation of transcription.* $900,000, 8/1/09-7/31/12, Co-PI (Keith Shearwin PI).

- NSF DMS0739261, *RTG: Complex Biological Systems Across Multiple Space and Time Scales*, $1,863,866, 6/1/08-5/31/11, Co-PI (Jonathan Rubin PI)
- Alfred P. Sloan Research Fellowship, $45,000, 12/1/06-8/31/08, PI
- NIGMS R01 GM083602-01, *Biological Models of Influenza A Virus*, $1,569,832, 7/1/07-6/31/11, Co-PI (Gilles Clermont PI)
- NIH R01 DC008290, *Hybrid Model of Vocal Fold Inflammation and Tissue Mobilization*, $3,063,074, 4/1/07-3/31/12, Co-PI (PI Katherine Verdolini)
- NSF DMS 0516646, *Mesoscale modeling of protein-DNA assemblies*, $64,094, 9/1/05-8/31/08, PI

Publications

[1] B. D. Coleman, E. Dill, & D. Swigon, On the dynamics of flexure and stretch in the theory of elastic rods, *Arch. Rational Mech. Anal.* **129**, 147–174 (1995).
Reprinted with commentary in *Localization and Solitary Waves in Solid Mechanics*, A.R. Champneys, G.W. Hunt, and J.M.T. Thompson (eds.), World Scientific, Singapore, 1999.

[2] B. D. Coleman, I. Tobias, & D. Swigon, Theory of influence of end conditions on self-contact in DNA loops, *J. Chem. Phys.* **103**, 9101–9019 (1995).

[3] D. Swigon, B. D. Coleman, & I. Tobias, The elastic rod model for DNA and its application to the tertiary structure of DNA minicircles in mononucleosomes, *Biophys. J.* **74**, 2515–2530 (1998).

[4] I. Tobias, D. Swigon, & B. D. Coleman, Elastic stability of DNA configurations: I. General theory, *Phys. Rev. E* **61**, 747-758 (2000).

[5] B. D. Coleman, D. Swigon, & I. Tobias, Elastic stability of DNA configurations: II. Supercoiled plasmids with self-contact, *Phys. Rev. E* **61**, 759-770 (2000).

[6] B. D. Coleman & D. Swigon, Theory of supercoiled elastic rings with self-contact and its application to DNA plasmids, *J. Elasticity*, **60**, 171-221 (2000).

[7] B. D. Coleman & D. Swigon, Theory of self-contact in DNA molecules modeled as elastic rods, *Nuovi progressi nella fisica matematica dall'eredità di Dario Graffi*, Accademia Nazionale dei Lincei, 281-295 (2001).

[8] D. Keller, D. Swigon, & C. Bustamante, Relating single molecule measurements to thermodynamics, *Biophys. J*, **84**, 733-738 (2003).

[9] B.D. Coleman, W.K. Olson, & D. Swigon, Theory of sequence-dependent DNA elasticity, *J. Chem. Phys.*, **118**, 7127-7140 (2003).

[10] C.L. Lawson, D. Swigon, K. Murakami, S.A. Darst, H.M. Berman, & R.H. Ebright, Catabolite activator protein (CAP): DNA binding and transcription activation, *Curr. Opin. Struct. Bio.* **14**, 1-11 (2004).

[11] B.D. Coleman & D. Swigon, Theory of self-contact in Kirchhoff rods with applications to supercoiling of knotted and unknotted DNA plasmids, *Phil. Trans. Roy. Soc. Lond. A*, **362**, 1281-1299 (2004).

[12] W.K. Olson, D. Swigon, & B.D. Coleman, Implications of the dependence of the elastic properties of DNA on nucleotide sequence, *Phil. Trans. Roy. Soc. Lond. A*, **362**, 1403-1422 (2004).

[13] D. Swigon, B.D. Coleman, & W.K. Olson, Modeling the Lac repressor-operator assembly: I. The influence of DNA looping on Lac repressor conformation, *Proc. Nat. Acad. Sci. USA*, **103**, 9879-9884 (2006).

[14] L. Czapla, D. Swigon, & W.K. Olson, Sequence-dependent Effects in the Cyclization of Short DNA, *J. Chem. Theory Comput.*, **2**, 685-695 (2006).

[15] B. Hancioglu, D. Swigon, & G. Clermont, A Dynamical Model of Human Immune Response to Influenza A Virus Infection, *J. Theor. Biol*, **246**, 70-86 (2007).

[16] Y. Biton, B.D. Coleman, & D. Swigon, On bifurcations of equilibria of intrinsically curved, electrically charged, rod-like structures that model DNA molecules in solution, *J. Elasticity*, **87**, 187-210 (2007).

[17] Q. Mi, D. Swigon, B. Riviere, S. Cetin, Y. Vodovotz, & D. Hackam, One-dimensional elastic continuum model of enterocyte layer migration, *Biophys. J.* **93**, 3745-3752 (2007).

[18] D. Swigon & W.K. Olson, Mesoscale modeling of multi-protein-DNA assemblies: the role of the catabolic activator protein in Lac repressor-mediated looping, *Int. J. Nonl. Mech.*, **43**, 1082–1093 (2008).

[19] L. Czapla, D. Swigon, & W.K. Olson, Effects of the nucleoid protein HU on the structure, flexibility, and ring-closure properties of DNA deduced from Monte-Carlo simulations, *J Mol. Biol.* **382**, 353-370 (2008).

[20] D. Swigon, The Mathematics of DNA Structure, Mechanics, and Dynamics, in *IMA Volumes in Mathematics and Its Applications 150*, Springer Verlag 2009.

[21] B. Riviere, Y. Epshteyn, D. Swigon, & Y. Vodovotz, A Mathematical Model of Signaling Resulting from the Binding of Lipopolysaccharide with Toll-like Receptors Demonstrates Inherent Preconditioning Behavior, *Math. Biosciences* **217**, 19-26 (2009).

[22] W.K. Olson, A.R. Srinivasan, A.V. Colasanti, G. Zheng, & D. Swigon, DNA Biomechanics, *Handbook of Molecular Biophysics*, 359-382 (2009).