

Stanford



Andrew Spakowitz

Associate Professor of Chemical Engineering and of Materials Science and Engineering and, by courtesy, of Applied Physics and of Chemistry

Bio

BIO

Theory and Computation of
Biological Processes and
Complex Materials

The Spakowitz lab is engaged in projects that address fundamental chemical and physical processes that underlie a range of key biological mysteries and cutting-edge materials applications. Current research in our lab focuses on three main research themes: DNA Biophysics, Protein Self Assembly, and Charge Transport in Conjugated Polymers. These broad research areas offer complementary perspectives on chemical and physical processes, and we leverage this complementarity throughout our research. Our approach draws from a diverse range of theoretical and computational methods, including analytical theory of semiflexible polymers, polymer field theory, continuum elastic mechanics, Brownian dynamics simulation, equilibrium and dynamic Monte Carlo simulations, and analytical theory and numerical simulations of reaction-diffusion phenomena. A common thread in our work is the need to capture phenomena over many length and time scales, and our flexibility in research methodologies allows us to address these problems at an unprecedented level of precision.

ACADEMIC APPOINTMENTS

- Associate Professor, Chemical Engineering
- Associate Professor, Materials Science and Engineering
- Associate Professor (By courtesy), Applied Physics
- Associate Professor (By courtesy), Chemistry
- Member, Bio-X
- Affiliate, Precourt Institute for Energy
- Member, Institute for Computational and Mathematical Engineering (ICME)

HONORS AND AWARDS

- Terman Fellow, Stanford University (2006-2009)
- CAREER Award, NSF (2009)

PROFESSIONAL EDUCATION

- PhD, California Institute of Technology (2004)

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Theory and computation of biological processes and complex materials

Teaching

COURSES

2019-20

- Applied Mathematics in the Chemical and Biological Sciences: CHEMENG 300, CME 330 (Aut)
- Data Science and Machine Learning Approaches in Chemical and Materials Engineering: CHEMENG 177, CHEMENG 277, MATSCI 166, MATSCI 176 (Spr)
- Graduate Practical Training: CHEMENG 299 (Sum)
- Materials Chemistry: MATSCI 192 (Win)
- Special Topics in Biopolymer Physics: CHEMENG 514 (Aut, Win, Spr, Sum)
- Undergraduate Practical Training: CHEMENG 199 (Sum)

2018-19

- Applied Mathematics in the Chemical and Biological Sciences: CHEMENG 300, CME 330 (Aut)
- Materials Chemistry: MATSCI 192, MATSCI 202 (Aut)
- Special Topics in Biopolymer Physics: CHEMENG 514 (Aut, Win, Spr, Sum)
- Undergraduate Practical Training: CHEMENG 199 (Sum)

2017-18

- Applied Mathematics in the Chemical and Biological Sciences: CHEMENG 300, CME 330 (Aut)
- Energy and Mass Transport: CHEMENG 120B (Spr)
- Materials Chemistry: MATSCI 192, MATSCI 202 (Aut)
- Special Topics in Biopolymer Physics: CHEMENG 514 (Aut, Win, Spr, Sum)

2016-17

- Applied Mathematics in the Chemical and Biological Sciences: CHEMENG 300, CME 330 (Aut)
- Energy and Mass Transport: CHEMENG 120B (Spr)
- Special Topics in Biopolymer Physics: CHEMENG 514 (Aut, Win, Spr, Sum)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Ross Bennett-Kennett, Jeremy Binagia, Camila Arantxa Cendra Guinassi, Travis Horst, Kevin Hou, Paul Rudnicki, Charles Starr, Linfeng Yang

Doctoral Dissertation Advisor (AC)

Bruno Beltran, Bob Feng, Quinn MacPherson, Sarah Sandholtz, Maha Yusuf

Doctoral Dissertation Co-Advisor (AC)

Pam Cai, Sean Friedowitz, Rikki Garner, Michael Reddick, Yanbing Zhu

Master's Program Advisor

Victoria Ng, Chenyi Xia

Doctoral (Program)

Sathya Ranjan Chitturi, Garrett LeCroy, ZEWEN ZHANG

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biophysics (Phd Program)

Publications

PUBLICATIONS

- **Bottom-up modeling of chromatin segregation due to epigenetic modifications.** *Proceedings of the National Academy of Sciences of the United States of America*
MacPherson, Q., Beltran, B., Spakowitz, A. J.
2018
- **Polymer Semiflexibility Induces Nonuniversal Phase Transitions in Diblock Copolymers** *PHYSICAL REVIEW LETTERS*
Mao, S., MacPherson, Q., Spakowitz, A. J.
2018; 120 (6): 067802
- **Interplay of Protein Binding Interactions, DNA Mechanics, and Entropy in DNA Looping Kinetics** *BIOPHYSICAL JOURNAL*
Mulligan, P. J., Chen, Y., Phillips, R., Spakowitz, A. J.
2015; 109 (3): 618-629
- **Percolation, Tie-Molecules, and the Microstructural Determinants of Charge Transport in Semicrystalline Conjugated Polymers** *ACS MACRO LETTERS*
Mollinger, S. A., Krajina, B. A., Noriega, R., Salleo, A., Spakowitz, A. J.
2015; 4 (7): 708-712
- **Thermodynamic model of heterochromatin formation through epigenetic regulation.** *Journal of physics. Condensed matter : an Institute of Physics journal*
Mulligan, P. J., Koslover, E. F., Spakowitz, A. J.
2015; 27 (6): 064109-?
- **Physical Modeling of Chromosome Segregation in Escherichia coli Reveals Impact of Force and DNA Relaxation.** *Biophysical journal*
Lampo, T. J., Kuwada, N. J., Wiggins, P. A., Spakowitz, A. J.
2015; 108 (1): 146-153
- **Membrane indentation triggers clathrin lattice reorganization and fluidization** *SOFT MATTER*
Cordella, N., Lampo, T. J., Melosh, N., Spakowitz, A. J.
2015; 11 (3): 439-448
- **Modulation of DNA loop lifetimes by the free energy of loop formation** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Chen, Y., Johnson, S., Mulligan, P., Spakowitz, A. J., Phillips, R.
2014; 111 (49): 17396-17401
- **Rheology and simulation of 2-dimensional clathrin protein network assembly.** *Soft matter*
VanDersarl, J. J., Mehraeen, S., Schoen, A. P., Heilshorn, S. C., Spakowitz, A. J., Melosh, N. A.
2014; 10 (33): 6219-6227
- **Multiscale dynamics of semiflexible polymers from a universal coarse-graining procedure** *PHYSICAL REVIEW E*
Koslover, E. F., Spakowitz, A. J.
2014; 90 (1)
- **Membrane fluctuations destabilize clathrin protein lattice order.** *Biophysical journal*
Cordella, N., Lampo, T. J., Mehraeen, S., Spakowitz, A. J.
2014; 106 (7): 1476-1488
- **Chain conformations dictate multiscale charge transport phenomena in disordered semiconducting polymers** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Noriega, R., Salleo, A., Spakowitz, A. J.
2013; 110 (41): 16315-16320

- **Caulobacter chromosome in vivo configuration matches model predictions for a supercoiled polymer in a cell-like confinement** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Hong, S., Toro, E., Mortensen, K. I., de la Rosa, M. A., Doniach, S., Shapiro, L., Spakowitz, A. J., McAdams, H. H.
2013; 110 (5): 1674-1679
- **Theoretical and Computational Modeling of Target-Site Search Kinetics In Vitro and In Vivo** *BIOPHYSICAL JOURNAL*
Koslover, E. F., Diaz de la Rosa, M. A., Spakowitz, A. J.
2011; 101 (4): 856-865
- **Tension-dependent structural deformation alters single-molecule transition kinetics** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Sudhanshu, B., Mihardja, S., Koslover, E. F., Mehraeen, S., Bustamante, C., Spakowitz, A. J.
2011; 108 (5): 1885-1890
- **Bacterial Chromosomal Loci Move Subdiffusively through a Viscoelastic Cytoplasm** *PHYSICAL REVIEW LETTERS*
Weber, S. C., Spakowitz, A. J., Theriot, J. A.
2010; 104 (23)
- **Twist- and Tension-Mediated Elastic Coupling between DNA-Binding Proteins** *PHYSICAL REVIEW LETTERS*
Koslover, E. F., Spakowitz, A. J.
2009; 102 (17)
- **Active DNA Olympic Hydrogels Driven by Topoisomerase Activity** *PHYSICAL REVIEW LETTERS*
Krajina, B. A., Zhu, A., Heilshorn, S. C., Spakowitz, A. J.
2018; 121 (14)
- **Strong disorder leads to scale invariance in complex biological systems** *PHYSICAL REVIEW E*
Stylianidou, S., Lampo, T. J., Spakowitz, A. J., Wiggins, P. A.
2018; 97 (6): 062410
- **Thermodynamic Model of Solvent Effects in Semiflexible Diblock and Random Copolymer Assembly** *MACROMOLECULES*
Mao, S., MacPherson, Q., Liu, C., Spakowitz, A. J.
2018; 51 (11): 4167-77
- **Stability on the Edge: Probing the Biophysical Mechanisms of Polarity Maintenance in Motile Cells**
Garner, R. M., Koslover, E., Spakowitz, A. J., Theriot, J. A.
CELL PRESS.2018: 648A-649A
- **A Polymer Physics Model for Epigenetic Control of Chromatin Compaction**
MacPherson, Q., Sandholtz, S., Spakowitz, A.
CELL PRESS.2018: 563A
- **Physical Modeling of the Spreading and Maintenance of Epigenetic Modifications through DNA Looping and Condensation**
Sandholtz, S., MacPherson, Q., Spakowitz, A.
CELL PRESS.2018: 583A
- **Long-Range Structural Changes in the Meiotic Nucleus Revealed by Changes in Stress Communication Along the Chromosome**
Newman, T., Beltran, B. G., McGehee, J., Cahoon, C., Elnatan, D., Chu, D., Burgess, S., Spakowitz, A.
CELL PRESS.2018: 30A
- **Interrogating Cell-Mediated Remodeling of the Extracellular Matrix by Dynamic Light Scattering Microrheology**
Krajina, B. A., Zhu, A., Heilshorn, S. C., Spakowitz, A. J.
CELL PRESS.2018: 371A-372A
- **Biotemplated synthesis of inorganic materials: An emerging paradigm for nanomaterial synthesis inspired by nature** *PROGRESS IN MATERIALS SCIENCE*
Krajina, B. A., Proctor, A. C., Schoen, A. P., Spakowitz, A. J., Heilshorn, S. C.
2018; 91: 1-23
- **Fluctuation Effects in Semiflexible Diblock Copolymers** *ACS MACRO LETTERS*

- Mao, S., MacPherson, Q., Spakowitz, A. J.
2018; 7 (1): 59–64
- **Dynamic Light Scattering Microrheology Reveals Multiscale Viscoelasticity of Polymer Gels and Precious Biological Materials** *ACS CENTRAL SCIENCE*
Krajina, B. A., Tropini, C., Zhu, A., DiGiacomo, P., Sonnenburg, J. L., Heilshorn, S. C., Spakowitz, A. J.
2017; 3 (12): 1294–1303
 - **Field-theoretic simulations of random copolymers with structural rigidity** *SOFT MATTER*
Mao, S., Macpherson, Q., Qin, J., Spakowitz, A. J.
2017; 13 (15): 2760-2772
 - **Buckling a Semiflexible Polymer Chain under Compression** *POLYMERS*
Pilyugina, E., Krajina, B., Spakowitz, A. J., Schieber, J. D.
2017; 9 (3)
 - **Crowding and hopping in a protein's diffusive transport on DNA** *JOURNAL OF PHYSICS A-MATHEMATICAL AND THEORETICAL*
Koslover, E. F., de la Rosa, M. D., Spakowitz, A. J.
2017; 50 (7)
 - **Cytoplasmic RNA-Protein Particles Exhibit Non-Gaussian Subdiffusive Behavior.** *Biophysical journal*
Lampo, T. J., Stylianidou, S., Backlund, M. P., Wiggins, P. A., Spakowitz, A. J.
2017; 112 (3): 532-542
 - **Anomalous Charge Transport in Conjugated Polymers Reveals Underlying Mechanisms of Trapping and Percolation** *ACS CENTRAL SCIENCE*
Mollinger, S. A., Salleo, A., Spakowitz, A. J.
2016; 2 (12): 910-915
 - **Large-Scale Conformational Transitions in Supercoiled DNA Revealed by Coarse-Grained Simulation** *BIOPHYSICAL JOURNAL*
Krajina, B. A., Spakowitz, A. J.
2016; 111 (7): 1339-1349
 - **Eliminating Fitting from the Modeling of Biological Processes.** *ACS central science*
Spakowitz, A. J.
2016; 2 (9): 584-585
 - **Impact of Conformational and Chemical Correlations on Microphase Segregation in Random Copolymers** *MACROMOLECULES*
Mao, S., MacPherson, Q. J., He, S. S., Coletta, E., Spakowitz, A. J.
2016; 49 (11): 4358-4368
 - **Potential for measurement of the distribution of DNA folds in complex environments using Correlated X-ray Scattering** *MODERN PHYSICS LETTERS B*
Schenk, G., Krajina, B., Spakowitz, A., Doniach, S.
2016; 30 (8)
 - **Physical Modeling of Dynamic Coupling between Chromosomal Loci** *BIOPHYSICAL JOURNAL*
Lampo, T. J., Kennard, A. S., Spakowitz, A. J.
2016; 110 (2): 338-347
 - **An in vitro assay for entry into cilia reveals unique properties of the soluble diffusion barrier** *JOURNAL OF CELL BIOLOGY*
Breslow, D. K., Koslover, E. F., Seydel, F., Spakowitz, A. J., Nachury, M. V.
2013; 203 (1): 129-147
 - **Systematic Coarse-Graining of Microscale Polymer Models as Effective Elastic Chains** *MACROMOLECULES*
Koslover, E. F., Spakowitz, A. J.
2013; 46 (5): 2003-2014
 - **Dynamic remodelling of disordered protein aggregates is an alternative pathway to achieve robust self-assembly of nanostructures** *SOFT MATTER*
Schoen, A. P., Cordella, N., Mehraeen, S., Arunagirinathan, M. A., Spakowitz, A. J., Heilshorn, S. C.
2013; 9 (38): 9137-9145
 - **Single molecule imaging reveals a major role for diffusion in the exploration of ciliary space by signaling receptors.** *eLife*
Ye, F., Breslow, D. K., Koslover, E. F., Spakowitz, A. J., Nelson, W. J., Nachury, M. V.

2013; 2

- **Theoretical study of nanostructured alkaline exchange membrane transport property**
Mao, S., Spakowitz, A., J., Coletta, E., He, S., Toney, M., Frank, C., W.
2013
- **Coarse grain model of nanostructured alkaline exchange membranes: Phase behavior and transport property predictions**
Mao, S., He, S., Coletta, E., Toney, M., Frank, C., W., Spakowitz, A., J.
2013
- **Theoretical study of nanostructured alkaline exchange membrane phase behavior and transport property**
Mao, S., Spakowitz, A., J., Coletta, E., He, S., Frank, C., W., Toney, M.
2013
- **Theoretical model for HP1-Induced heterochromatin formation**
Mulligan, P., J., Koslover, E., F., Spakowitz, A., J.
2013
- **Systematic coarse-graining of the wormlike chain model for dynamic simulations**
Koslover, E., F., Spakowitz, A., J.
2013
- **Semiflexible polymer model for charge mobility in liquid crystalline organic semiconductors**
Mollinger, S., Noriega, R., Salleo, A., Spakowitz, A., J.
2013
- **Self-assembled protein structures are altered by underlying fluctuations**
Cordella, N., Lampo, T., Heilshorn, S., C., Spakowitz, A., J.
2013
- **Membrane Fluctuations Destabilize Clathrin Protein Lattice Order** *Biophysical Journal*
Cordella, N., Lampo, T., J., Mehraeen, S., Spakowitz, A., J.
2013
- **Physical modeling of chromosome segregation in E. Coli reveals impact of force and DNA relaxation**
Lampo, T., Kuwada, N., Wiggins, P., Spakowitz, A., J.
2013
- **Effect of conformation in charge transport for semiflexible polymers**
Noriega, R., Salleo, A., Spakowitz, A., J.
2013
- **An amphiphilic polysulfone-graft-poly(ethylene) glycol random copolymer for alkaline exchange membrane fuel cells**
He, S., Mao, S., Spakowitz, A., J., Frank, C., W.
2013
- **Discretizing elastic chains for coarse-grained polymer models** *SOFT MATTER*
Koslover, E. F., Spakowitz, A. J.
2013; 9 (29): 7016-7027
- **Intrinsic fluctuations lead to broad range of transduced forces in tethered-bead single-molecule experiments** *PHYSICAL REVIEW E*
Mehraeen, S., Spakowitz, A. J.
2012; 86 (2)
- **Force fluctuations impact kinetics of biomolecular systems** *PHYSICAL REVIEW E*
Koslover, E. F., Spakowitz, A. J.
2012; 86 (1)
- **Analytical Tools To Distinguish the Effects of Localization Error, Confinement, and Medium Elasticity on the Velocity Autocorrelation Function** *BIOPHYSICAL JOURNAL*
Weber, S. C., Thompson, M. A., Moerner, W. E., Spakowitz, A. J., Theriot, J. A.

2012; 102 (11): 2443-2450

- **Nonthermal ATP-dependent fluctuations contribute to the in vivo motion of chromosomal loci** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*

Weber, S. C., Spakowitz, A. J., Theriot, J. A.

2012; 109 (19): 7338-7343

- **Membrane fluctuations alter the fluidity of clathrin protein lattices**

Spakowitz, A., J., Cordella, N., Mehraeen, S.

2012

- **Viral Packaging of Nucleic Acids** *Polymer Science: A Comprehensive Reference*

Spakowitz, A., J., Muthukumar, M.

edited by Möller, M., Matyjaszewski, K.

Elsevier Academic Press, San Diego, CA..2012: 231–245

- **Self-Assembly of Clathrin Protein 3D Structures**

Arunagirinathan, M., A., Gibbons, B., J., Schoen, A., P., Spakowitz, A., J., Heilshorn, S., C.

2012

- **Force Fluctuations Impact Genome Processing Kinetics**

Spakowitz, A., J., Koslover, E.

2012

- **Bridging Length Scales: Hierarchical Coarse-Graining of Elastic Biopolymer Models**

Koslover, E., F., Spakowitz, A., J.

2012

- **Stability of Heterochromatin Condensation Due to Cooperative Binding**

Mulligan, P., J., Koslover, E., F., Spakowitz, A., J.

2012

- **Force Fluctuations Play a Key Role in Biomolecular Kinetics**

Koslover, E., F., Spakowitz, A., J.

2012

- **Selective dispersion of high purity semiconducting single-walled carbon nanotubes with regioregular poly(3-alkylthiophene)s** *NATURE COMMUNICATIONS*

Lee, H. W., Yoon, Y., Park, S., Oh, J. H., Hong, S., Liyanage, L. S., Wang, H., Morishita, S., Patil, N., Park, Y. J., Park, J. J., Spakowitz, A., Galli, et al
2011; 2

- **A Boltzmann-weighted hopping model of charge transport in organic semicrystalline films** *JOURNAL OF APPLIED PHYSICS*

Kwiatkowski, J. J., Jimison, L. H., Salleo, A., Spakowitz, A. J.

2011; 109 (11)

- **Impact of defect creation and motion on the thermodynamics and large-scale reorganization of self-assembled clathrin lattices** *SOFT MATTER*

Mehraeen, S., Cordella, N., Yoo, J. S., Spakowitz, A. J.

2011; 7 (19): 8789-8799

- **Impact of Defect Creation and Motion On the Large-Scale Reorganization Dynamics of Self-Assembled Clathrin Lattices**

Mehraeen, S., Cordella, N., Spakowitz, A., J.

2011

- **Force Fluctuations Dictate Kinetics of Biomolecular Systems**

Spakowitz, A., J.

2011

- **Theoretical Modeling of the Packaging and Accessibility of DNA**

Koslover, E., F., Mulligan, P., J., Díaz de la Rosa, M., A., Spakowitz, A., J.

2011

- **Heterochromatin Protein 1: An Epigenetic Mechanism for Chromatin Condensation**
Mulligan, P., J., Koslover, E., F., Spakowitz, A., J.
2011
- **Force Fluctuations Dictate Kinetics of Biomolecular Systems**
Koslover, E., F., Spakowitz, A., J.
2011
- **Local Geometry and Elasticity in Compact Chromatin Structure** *BIOPHYSICAL JOURNAL*
Koslover, E. F., Fuller, C. J., Straight, A. F., Spakowitz, A. J.
2010; 99 (12): 3941-3950
- **Subdiffusive motion of a polymer composed of subdiffusive monomers** *PHYSICAL REVIEW E*
Weber, S. C., Theriot, J. A., Spakowitz, A. J.
2010; 82 (1)
- **Dynamic Strategies for Target-Site Search by DNA-Binding Proteins** *BIOPHYSICAL JOURNAL*
de la Rosa, M. A., Koslover, E. F., Mulligan, P. J., Spakowitz, A. J.
2010; 98 (12): 2943-2953
- **Mathematical Modeling of Charge Transport in Conjugated-Polymer Materials**
Spakowitz, A., J.
2010
- **Theoretical Modeling of the Weaving of Clathrin Into Nanoscale Baskets**
Mehraeen, S., Cordella, N., Yoo, J., S., Spakowitz, Andrew, J.
2010
- **Theoretical Model of HPI-Induced Heterochromatin Formation**
Mulligan, P., J., Koslover, E., F., Spakowitz, Andrew, J.
2010
- **Target site search strategy of DNA-binding proteins**
Díaz de la Rosa, M., A., Koslover, E., F., Mulligan, P., J., Spakowitz, A., J.
2010
- **Role of DNA fluctuations and conformations in RNP polymerase translocation and bulge formation in a single nucleosome**
Sudhanshu, B., Koslover, E., F., Mihardja, S., Spakowitz, A., J.
2010
- **Role of DNA Elasticity and Nucleosome Geometry in Hierarchical Packaging of Chromatin**
Koslover, E., F., Fuller, C., Straight, A., F., Spakowitz, A., J.
2010
- **A Predictive Theoretical Model For Clathrin Self-Assembly**
Mehraeen, S., Cordella, N., Spakowitz, A., J.
2010
- **Chromosomal loci move subdiffusively through a viscoelastic cytoplasm** *Physical Review Letters*
Weber, S., Spakowitz, A., J., Theriot, J.
2010; 104: 238102
- **Translocation Dynamics of DNA-Binding Proteins**
Díaz de la Rosa, M., A., Koslover, E., F., Mulligan, P., J., Spakowitz, A., J.
2010
- **Modeling Effects of Nanoparticle Size and Ligand Display On Targeted Cell-Surface Binding**
Cordella, N., Mehraeen, S., Yoo, J., S., Spakowitz, Andrew, J.
2010

- **Chromosomal Loci Move Subdiffusively through a Viscoelastic Cytoplasm**
Spakowitz, A., J., Weber, S., Theriot, J.
2010
- **The Impact of Biological Fluctuations On Transport Processes within Live Bacterial Cells**
Spakowitz, A., J., Weber, S., Theriot, J.
2010
- **Modeling Targeted Binding of Nanoparticles to Cell Surfaces**
Cordella, N., Mehraeen, S., Spakowitz, A., J.
2010
- **Twist and Tension-Mediated Elastic Coupling between DNA-Bending Proteins**
Koslover, E., F., Spakowitz, A., J.
2009
- **Target Site Search Strategy Of Gene Regulatory Proteins**
Díaz de la Rosa, M., A., Spakowitz, A., J.
2009
- **Theoretical model for the self-assembly of clathrin into targeted nanoscale assemblies**
Mehraeen, S., Schoen, A., Hwang, S., Y., Heilshorn, S., C., Spakowitz, A., J.
2009
- **Target site search strategy of gene regulatory proteins**
Spakowitz, A., J.
2009
- **End-to-end distribution for a wormlike chain in arbitrary dimensions** *PHYSICAL REVIEW E*
Mehraeen, S., Sudhanshu, B., Koslover, E. F., Spakowitz, A. J.
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- **Optical measurement of mechanical forces inside short DNA loops** *BIOPHYSICAL JOURNAL*
Shroff, H., Sivak, D., Siegel, J. J., McEvoy, A. L., Siu, M., Spakowitz, A., Geissler, P. L., Liphardt, J.
2008; 94 (6): 2179-2186
- **Three-dimensional architecture of the bacteriophage phi 29 packaged genome and elucidation of its packaging process** *VIROLOGY*
Comolli, L. R., Spakowitz, A. J., Siegerist, C. E., Jardine, P. J., Grimes, S., Anderson, D. L., Bustamante, C., Downing, K. H.
2008; 371 (2): 267-277
- **Unraveling the Dynamics of Supercoiled DNA with Theoretical Modeling**
Díaz de la Rosa, M., A., Spakowitz, A., J.
2008
- **Structural Fluctuations In the Nucleosome Core Particle**
Sudhanshu, B., Spakowitz, A., J.
2008
- **Chemical Physics Of DNA Packaging In A Nucleosome Core Particle**
Sudhanshu, B., Spakowitz, A., J.
2008
- **Direct optical measurement of stresses inside circularized DNA loops** *51st Annual Meeting of the Biophysical-Society*
Siegel, J., Shroff, H., Sivak, D., McEvoy, A., Spakowitz, A., Geissler, P., Liphardt, J.
CELL PRESS.2007: 350A–350A
- **Target-Site Search Strategies of DNA-Binding Proteins**
Díaz de la Rosa, M., A., Spakowitz, A., J.
2007

- **Theory of Translational and Rotational Fluctuations in Tethered-Bead Single-Molecule Experiments**
Mehraeen, S., Spakowitz, A., J.
2007
- **Target Site Search Strategy Of Gene Regulatory Proteins**
Díaz de la Rosa, M., A., Spakowitz, A., J.
2007
- **Chemical Physics Of DNA Packaging In A Nucleosome Core Particle**
Sudhanshu, B., Spakowitz, A., J.
2007
- **Wrapping Transitions for a Single Nucleosome Under Tension**
Sudhanshu, B., Spakowitz, A., J.
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- **High flexibility of DNA on short length scales probed by atomic force microscopy** *NATURE NANOTECHNOLOGY*
Wiggins, P. A., Van der Heijden, T., Moreno-Herrero, F., Spakowitz, A., Phillips, R., Widom, J., Dekker, C., Nelson, P. C.
2006; 1 (2): 137-141
- **Effect of force on mononucleosomal dynamics** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Mihardja, S., Spakowitz, A. J., Zhang, Y., Bustamante, C.
2006; 103 (43): 15871-15876
- **Wormlike chain statistics with twist and fixed ends** *EUROPHYSICS LETTERS*
Spakowitz, A. J.
2006; 73 (5): 684-690
- **DNA Structure within a Virus Particle**
Spakowitz, A., J., Comolli, L., Siegerist, C., E., Grimes, S., Jardine, P., Downing, K., H.
2006
- **Coupled Translational and Rotational Fluctuations of Tethered Beads**
Spakowitz, A., J., Bustamante, C.
2006
- **Wrapping Transitions in a Single Nucleosome Under Tension**
Spakowitz, A., J., Mihardja, S., Bustamante, C.
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- **Biocompatible force sensor with optical readout and dimensions of 6 nm(3)** *NANO LETTERS*
Shroff, H., Reinhard, B. M., Siu, M., Agarwal, H., Spakowitz, A., Liphardt, J.
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- **DNA packaging in bacteriophage: Is twist important?** *Biophysical Journal*
Spakowitz, A., J., Wang, Z., G.
2005; 88: 3912
- **Semiflexible chain statistics with fixed end orientations**
Spakowitz, A., J.
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- **Topological considerations in nucleic acid hybridization kinetics** *Nucleic Acids Research*
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