The Spakowitz lab is engaged in projects that address fundamental chemical and physical phenomena underlying a range of biological processes and soft-material applications. Current research in our lab focuses on four main research themes: chromosomal organization and dynamics, protein self-assembly, polymer membranes, and charge transport in conducting 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 provides us with the critical tools to address these complex multidisciplinary problems.
LINKS

• Spakowitz Research Group Website: http://web.stanford.edu/~ajspakow/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS
Theory and computation of biological processes and complex materials

Teaching

COURSES

2022-23
• Special Topics in Biopolymer Physics: CHEMENG 514 (Aut)
• Undergraduate Practical Training: CHEMENG 199 (Sum)

2021-22
• 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)
• Special Topics in Biopolymer Physics: CHEMENG 514 (Aut, Win, Spr, Sum)
• Undergraduate Practical Training: CHEMENG 199 (Sum)

2020-21
• 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, MATSCI 202 (Win)
• Special Topics in Biopolymer Physics: CHEMENG 514 (Aut, Win, Spr, Sum)
• Undergraduate Practical Training: CHEMENG 199 (Sum)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)
John Belanger, Ray Chang, Soren Holm, Jacob Horne, Dean Lahana, Garrett LeCroy, Olivia Saouaf, Tee Udomlumleart

Postdoctoral Faculty Sponsor
Sayantan Dutta

Doctoral Dissertation Advisor (AC)
Michael Beckinghausen, Thomas Habte, Angelika Hirsch, Zachary Montgomerie, Ariana Tse, Joseph Wakim

Master's Program Advisor
Rahi Miraftab-Salo

Doctoral Dissertation Co-Advisor (AC)
Goldie Roth, Sevahn Vorperian, Louis Wang, William Xu

Doctoral (Program)
Sathya Ranjan Chitturi
Postdoctoral Research Mentor
Sayantan Dutta

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biophysics (Phd Program)

Publications

PUBLICATIONS

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  Bucci, G., Spakowitz, A. J.
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Andrew Spakowitz
http://cap.stanford.edu/profiles/Andrew_Spakowitz/

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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

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Mulligan, P. J., Koslover, E. F., Spakowitz, A. J.
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- **Theoretical Modeling of the Packaging and Accessibility of DNA**
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- **Theoretical Model of HP1-Induced Heterochromatin Formation**
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