Amit Shavit

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Education

Ph.D., Chemical and Biomolecular Engineering Expected 2015
University of Pennsylvania, Philadelphia, PA

- Dissertation Title: Nanomechanics of Glassy Polymers Under Confinement
- Research Adviser: Robert Riggleman
- Research Field: Computational Polymer Physics

B.S., Chemical Engineering Spring 2010
University of Massachusetts, Amherst, MA

- GPA: 3.81/4.00 — *Summa cum Laude*, with highest University and Departmental Honors
- Minor in Chemistry | Specialization in Biochemical Engineering

- Honors Thesis Title: Characterization and Optimization of *Taxus* Single Cell Culture Growth and a Live Cell-Based Assay for the Detection of Paclitaxel
- Research Adviser: Susan Roberts
- Research: Using fundamental metabolic engineering to optimize production and intracellular accumulation of paclitaxel in *Taxus* plant cell cultures, as means to reduce the high cost of Taxol

Honors and Awards

Audience Favorite Award at Penn iTalks Spring 2014
University of Pennsylvania

GAPSA Travel Grant Spring 2013, Spring 2014
University of Pennsylvania

1st Place, Best Poster Award Spring 2013
Polymer Poster Session at University of Pennsylvania

EAPSI Fellow Spring 2013
National Science Foundation

Excellence in Teaching Certificate Fall 2012
University of Pennsylvania

Arkema Fellow Fall 2011
Arkema Incorporated

Dean's List Fall 2006 – Spring 2010
University of Massachusetts, Amherst

Research Experience for Undergraduates Award Summer 2009
National Science Foundation

Chris Gagne Scholarship Spring 2008
University of Massachusetts, Amherst

Research Grant Award Spring 2008
Commonwealth Honors College

Engineering Scholarship Award Spring 2007
University of Massachusetts Engineering Alumni Association

Stanley Z. Koplik Full Tuition Scholarship Fall 2006
State of Massachusetts

Relevant Experience

Doctoral Candidate Fall 2010 – Present
University of Pennsylvania, Philadelphia, PA

- Adviser: Robert Riggleman
- Dissertation Title: Nanomechanics of Glassy Polymers Under Confinement
- Developed serial and parallel novel algorithms to analyze confined glassy polymers using Molecular Dynamics and Monte Carlo simulations
- Investigated glass-forming polymers in free-standing films, in supported films, and in pillar geometries
- Published four first author papers in reputable journals and presented research in 17 local and national presentations

Summer Research Fellow Summer 2013
Academia Sinica, Taipei, Taiwan

- Adviser: Yeng-Long Chen
- Researched the effect of slit confinement on the dynamics and behavior of semi-flexible polymer chains (*e.g.,* DNA) using Brownian Dynamics simulations
- Developed parallel algorithms that use the CUDA architecture of NVIDA graphics processing units to efficiently run simulations and analysis routines
- Summarized results in a poster and two reports submitted to the Taiwanese National Science Council and the United States' National Science Foundation
- Formed a lasting collaboration between Professor Yeng-Long Chen and Professor Robert Riggleman

Summer Researcher Summer 2009
University of Colorado, Boulder, CA

- Adviser: Daniel Schwartz
- Researched the wettability and anchoring of nematic liquid crystals (LCs) at the solid/LC interface using a two-component mixture of ocatdecyltriethoxysilane (C18) and ethyltriethoxysilane (C2)
- Utilized contact angle goniometry, variable-angle ellipsometry, and formation of LC cells to characterize and model the two- component mixture samples
- Successfully reduced the contact angle by more than 50 percent without sacrificing perpendicular anchoring
- Prepared a poster for the chemical engineering department and formulated a final report for Professor Schwartz and his research group, as well as the program administrators
- Placed third in the poster competition, allowing me to present the poster at the national AIChE conference on November 9, 2009

Summer and Winter Intern Summer 2008, Winter 2009
Millipore Corporation, Bedford, MA

- Researched impurities clearance and product yield in multiple reuse Protein A chromatography media
- Quantified DNA and HCP levels using standard PicoGreen and ELISA assays
- Developed and optimized a new protocol to clarify and characterize Chinese Hamster Ovary (CHO) cells directly from the reactor
- Summarized results in two papers published within company
- Presented findings to members of the chromatography department

Student Researcher Fall 2007 – Spring 2010
University of Massachusetts, Amherst, MA

- Proposed and developed a multi-parameter study on *Taxus cuspidata* cell cultures
- Correlated genomic stability with DNA and protein content, cell size and complexity, and elicitation effects using multi-parameter flow cytometry, and presented my results in a formal paper to faculty
- Successfully optimized and reduced the time of a *Taxus* staining protocol by 75 percent

Publications

Shavit, A., and Riggleman, R.A. (2014). Physical Aging, the Local Dynamics of Glass-Forming Polymers Under Nanoscale Confinement. *Journal of Physical Chemistry B, 118*(30), 9096–9103.

Shavit, A., and Riggleman, R.A. (2014). Strain Localization in Glassy Polymers Under Cylindrical Confinement. *Physical Chemistry Chemical Physics, 16*(22), 10301–10309.

Shavit, A., and Riggleman, R. A. (2013). Influence of Backbone Rigidity on Nanoscale Confinement Effects in Model Glass-Forming Polymer. *Macromolecules, 46*(12), 5044–5052.

Shavit, A., Douglas, J., and Riggleman, R. A. (2013) Evolution of Collective Motion in a Model Glass-Forming Liquid During Physical Aging. *Journal of Chemical Physics, 138*(12A528), 1–6.

Noonan P.S., **Shavit A.**, Acharya B. R., and Schwartz D. K. (2011). Mixed Alkylsilane Functionalized Surfaces for Simultaneous Wetting and Homeotropic Anchoring of Liquid Crystals. *ACS Applied Materials & Interfaces, 3*(4374), 4374–4380.

US Provisional Patent Application #61/537,943, filed 9/22/2011. "Mixed Alkylsilane Functionalized Surfaces for Simultaneous Wetting and Homeotropic Anchoring of Liquid Crystals"

Presentations

Shavit, A. & Riggleman, R. (October 2014). Dynamics and Mechanical Properties of Glassy Polymers Under Cylindrical Confinement. Paper and Poster presented at *2014 Graduate Student Symposium at Penn*, Philadelphia, PA
I was the Co-Chair of the *2014 Graduate Student Symposium* organizing committee. 30 industry representatives and 70 faculty and students attended. Over 50% increase in attendance from previous years.

Shavit, A. & Riggleman, R. (July 2014). Strain Localization in Cylindrically Confined Glassy Polymers. Poster presented at *Gordon Research Conference*, South Haldey, MA

Shavit, A. & Riggleman, R. (July 2014). Dynamics and Mechanical Properties of Glassy Polymers Under Cylindrical Confinement. Paper presented at *DISCONAP Seminar*, Philadelphia, PA

Shavit, A. & Riggleman, R. (June 2014). Dynamics and Mechanical Properties of Glassy Polymers Under Cylindrical Confinement. Paper presented at the *American Chemical Society Colloids Symposium*, Philadelphia, PA

Shavit, A. (April 2014). Using Computer Simulations to Tackle Polymer Physics on a Molecular Level. Paper presented at *Penn iTalks*, Philadelphia, PA
Winner of Audience Favorite Award
YouTube video of talk can be found here: http://goo.gl/5t3fsV

Shavit, A. & Riggleman, R. (March 2014). Dynamics and Mechanical Properties of Glassy Polymers Under Cylindrical Confinement. Paper presented at the *American Physical Society March Meeting*, Denver, CO

Shavit, A., & Riggleman, R. (February 2014). Understanding Glass-Forming Polymers in Confinement through Molecular Dynamics Simulations. Paper presented at *Chemical and Biomolecular Departmental Seminar*, Philadelphia, PA

Shavit, A., & Riggleman, R. (January 2014). Understanding Glass-Forming Polymers in Confinement Through Molecular Dynamics Simulations. Paper presented at *DISCONAP Seminar*, Philadelphia, PA

Shavit, A. & Riggleman, R. (November 2013). Effects of Nanoscale Confinement on the Physical Aging of Glassy Polymers. Poster presented at the *Graduate Student Symposium at Penn*, Philadelphia, PA

Shavit, A. & Riggleman, R. (November 2013). Effects of Nanoscale Confinement on the Physical Aging of Glassy Polymers. Paper presented at the *American Institute of Chemical Engineers Annual Meeting*, San Francisco, CA

Shavit, A., Glor, E., Fakhraai, Z., & Riggleman, R. (October 2013). Glassy Polymers In Confinement: Perspectives From Experiments and Simulations. Paper presented at *DISCONAP Seminar*, Philadelphia, PA

Shavit, A. & Chen, Y.-L. (August 2013). Understanding Semiflexible Polymer Chains in Nanoscale Confinement. Poster presented at the *EAPSI Poster Session*, Taipei, Taiwan

Shavit, A. & Riggleman, R. (June 2013). Understanding Nanoscale Confinement of Glassy Polymers on a Molecular Scale. Poster presented at the *Penn Polymer Poster Session*, Philadelphia, PA

Shavit, A. & Riggleman, R. (March 2013). Effects of Nanoscale Confinement on the Physical Aging of Glassy Polymers. Paper presented at the *American Physical Society March Meeting*, Baltimore, PA

Shavit, A. & Riggleman, R. (November 2012). Effects of Nanoscale Confinement on the Properties of Glassy Polymers. Poster presented at the *Graduate Student Symposium at Penn*, Philadelphia, PA

Shavit, A. & Riggleman, R. (August 2012). Coarse-grained modeling of thin polymer films. Paper presented at the *American Chemical Society* 244^{th} *National Meeting*, Philadelphia, PA.

Shavit, A. & Riggleman, R. (May 2012). Effect of Confinement on Glass-Forming Polymers. Paper presented at *DISCONAP Seminar*, Philadelphia, PA

Shavit, A. & Riggleman, R. (May 2012). Effect of Confinement on Glass-Forming Polymers. Paper presented at *Penn Polymer Meeting*, Philadelphia, PA

Riggleman, R. & **Shavit, A.** (February 2012). Molecular simulations of confined polymer glasses. Paper presented at the *American Physical Society Meeting*, Boston, MA.

Shavit, A. & Riggleman, R. (October 2011). Molecular simulations of confined glass-forming polymers. Paper presented at the *American Institute of Chemical Engineers Annual Meeting*, Minneapolis, MN.

Gaurav, V., **Shavit, A.** & Roberts, S. (March 2010). Nuclear DNA and protein content evaluation in *Taxus* plant cell cultures using multiparameter flow cytometry. Poster presented at the *American Chemical Society Spring Meeting*, San Francisco, CA.

Shavit, A., Malone, S. & Schwartz, D. (November 2009). Controlling the dewetting of liquid crystals using two-component self-assembled monolayers. Poster presented at the *American Institute of Chemical Engineers Annual Meeting*, Nashville, TN.

Leadership

Mentor to Graduate Student Fall 2013 – Fall 2014
University of Pennsylvania, Philadelphia PA

- Mentored a first-year Master's student in Chemical and Biomolecular Engineering
- Developed a research project together investigating the dewetting phenomenon in thin glassy films on repulsive substrates
- Assisted with project development through brainstorming sessions and provided programming codes to produce research results
- Presented results in weekly meetings with our collaborator Professor Zahra Fakhraai

Co-organizer for Graduate Student Symposium Spring 2013 – Fall 2014
University of Pennsylvania, Philadelphia PA

- Co-organized the annual graduate student symposium for 100 attendees
- Developed a website for the symposium and actively participated in its planning
- Co-managed and lead a committee of eight graduate students and coordinated administrative tasks
- Promoted the event in career fairs and communicated with industry representatives
- Increased the number of attendees from industry by more than 50%

Mentor in Summer Academy in Applied Science and Technology July 2012
University of Pennsylvania, Philadelphia PA

- Mentored and lead six high school students in their sophomore and junior years
- Assisted in development and inception of projects about maximizing *Taxol* production
- Corrected weekly progress reports and suggested alternative research approaches

Graduate Mentor to Undergraduates Spring 2012 – Spring 2013
University of Pennsylvania, Philadelphia, PA

- Mentored a second-year undergraduate student
- Developed a research project together focusing on the role of molecular architecture in confined polymer films
- Assisted in programming analysis codes and discussed significance of the obtained results

Vice President of International Society of Pharmaceutical Engineers Spring 2009

University of Massachusetts, Amherst, MA

- Coordinated events, informed, motivated and recruited new students to the Society
- Developed a successful tutoring program for undergraduate chemical engineering students
- Tutored undergraduate chemical engineering students
- Rose in the ranks from Member (2007) & Executive Board Member (2008) to Vice President (2009)

Computing Experience

Languages and APIs: C & C++, Python, BASH, Cluster Computing, Parallel Computing (OpenMP), GPU Computing (CUDA), OpenACC, HTML, CSS, SASS

Computational Software: MATLAB, Mathematica, LAMMPS, GROMACS, Distill, Aspen, MathCAD

Operating Systems and Miscellaneous: LaTeX, Unix (OS X), Linux, Windows

Teaching Experience

Graduate Teaching Assistant Spring 2013
University of Pennsylvania, Philadelphia, PA

- Graduate Statistical Mechanics in Materials Science Engineering with Professor Mahadevan Khantha
- Held office hours and answered student questions
- Graded homework and assisted in grading exams

Graduate Teaching Assistant Fall 2012
University of Pennsylvania, Philadelphia, PA

- Graduate Molecular Modeling & Simulations with Professor Robert Riggleman
- Developed weekly recitation sessions that focused on teaching fundamental programming skills and provided help with class material
- Held office hours to answer student questions
- Graded homework and assisted in grading exams

Graduate Teaching Assistant Fall 2011
University of Pennsylvania, Philadelphia, PA

- Graduate Thermodynamics with Professor Robert Riggleman
- Held office hours and answered student questions
- Graded homework and assisted in grading exams

Citizenship

Citizen of the United States of America