

DAYONG CHEN

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Education

Postdoc.	Chemical Engineering/Mechanical Engineering Massachusetts Institute of Technology Advisors: Robert E. Cohen and Gareth H. McKinley	2014-Present
Ph.D.	Polymer Science and Engineering University of Massachusetts Amherst Advisor: Ryan C. Hayward	2008-2014
M.S.	Biomedical Engineering Tianjin University, China Advisor: Wenguang Liu	2006-2008
B.S.	Major in Materials Science and Engineering Tianjin University, China	2002-2006

Research Experience

Massachusetts Institute of Technology Cambridge, MA

- Developed new approaches for patterning surface wettability for applications including water harvesting, self cleaning, and drag reduction
- Designed antifreeze-proteins inspired polymers for robust anti-icing coatings
- Designed and fabricated polymer films with tunable wetting and transparency for smart windows
- Modeling hierarchical geometry with multiple length scales for superomniphobic surfaces

University of Massachusetts Amherst, MA

- Developed new experimental methods to study elastic surface instability (creasing instability) and the role of surface energy in nucleation and growth of creases
- Prepared superparamagnetic elastomers to study the effects of magnetic fields on surface instabilities
- Fabricated micro-patterned gold/ITO electrodes (via photolithography, e-beam evaporation and lift off/chemical etching) to investigate electric field triggering of creasing instability
- Developed hydrogel bilayer systems to study creases on the interface of two stimuli-responsive hydrogels
- Surface modification via physical and chemical methods, including oxygen plasma and silane chemistry, to prepare hydrophilic or hydrophobic surfaces
- Synthesized and characterized photo-crosslinkable polymers including biodegradable polyester, PDMS/poly(*n*-butyl acrylate) elastomers and poly(*N*-isopropyl acrylamide)-based hydrogels
- Fabricated micro-patterned hydrogel cell culture substrates via surface instabilities to study the effects of mechanical strain, as well as substrate geometry, on cell behavior

Tianjin University Tianjin, China

- Synthesized (via ATRP) and characterized *N*-isopropyl acrylamide/hydroxyethyl methacrylate triblock copolymers to study the aqueous solution behavior of these copolymers
- Synthesized and prepared poly(vinyldiaminotriazine)-based non-viral gene delivery vectors via ATRP and click chemistry
- Gel Electrophoresis, Cell Culture, Gene Transfection and Cytotoxicity Assay

Peer-reviewed Publications

1. **Dayong Chen**, Hossein Sojoudi, Karen K. Gleason, Robert E. Cohen, Gareth H. McKinley, A self-cleaning smart window enabled by superhydrophobicity and electrochromism, manuscript in preparation (2016).
2. **Dayong Chen**, Robert E. Cohen, Gareth H. McKinley, Antifreeze-proteins inspired polymers for robust anti-icing coatings, manuscript in preparation (2016).
3. Dhananjai Saranadhi*, **Dayong Chen***, Justin A. Kleingartner, Siddarth Srinivasan, Robert E. Cohen, Gareth H. McKinley, Sustained drag reduction in turbulent flows using a low-temperature Leidenfrost surface, to be submitted to *Science Advances* (2016) (*equal contribution).
4. Steven Wang*, **Dayong Chen***, Jin Shang*, Bavand Keshavarz, Paul A. Webley, Eric F. May, Gareth H. McKinley and Kevin (Gang) Li, Solid Leidenfrost effect for super-lubricated transportation, to be submitted to *Energy and Environmental Science* (2016) (*equal contribution).
5. **Dayong Chen**, Gareth H. McKinley, Robert E. Cohen, Spontaneous wettability patterning via creasing instability, *Proceedings of the National Academy of Sciences U. S. A.* Under revision (2016).
6. Hua Sun*, **Dayong Chen***, Danqi Wang, David Schiraldi, Tough polymer aerogels incorporating a conformal inorganic coating for low flammability and durable hydrophobicity, submitted to *Journal of Materials Chemistry A* (2015) (*equal contribution).
7. **Dayong Chen**, Beth Cooper, Angela Silvers, Todd Emrick and Ryan C. Hayward, Photopatternable biodegradable aliphatic polyester prepared via a photo-grafting approach, *Biomacromolecules*, 16, 3329-3335 (2015).
8. **Dayong Chen**, Robert Hyldahl, Ryan C. Hayward, Creased hydrogels as active platforms for mechanical deformation of cultured cells, *Lab on a chip*, 15, 1160-1167 (2015).
9. **Dayong Chen**, Jinhwan Yoon, Dinesh Chandra, Al Crosby, Ryan C. Hayward, Stimuli-responsive buckling mechanics of polymer films, *Journal of Polymer Science Part B: Polymer Physics*, 52, 1441–1461 (2014) (Invited review).
10. Bin Xu, **Dayong Chen**, Ryan C. Hayward, Mechanically gated electrical switches by creasing of patterned metal/elastomer bilayer films, *Advanced Materials*, 26, 4381–4385 (2014).
11. **Dayong Chen**, Lihua Jin, Zhigang Suo, Ryan C. Hayward, Controlled formation and disappearance of creases, *Materials Horizons*, 1, 207-213 (2014) (Selected as the front cover).
12. Lihua Jin, **Dayong Chen**, Ryan C. Hayward, Zhigang Suo, Creases on the interface between two soft materials, *Soft Matter*, 10, 303-311 (2014).
13. **Dayong Chen**, Shengqiang Cai, Zhigang Suo, Ryan C. Hayward, Surface energy as a barrier to creasing of elastomer films: an elastic analogy to classical nucleation, *Physical Review Letters*, 109, 038001 (2012).
14. Shengqiang Cai*, **Dayong Chen***, Zhigang Suo, Ryan C. Hayward, Creasing instability of elastomer films, *Soft Matter*, 8, 1301-1304 (2012) (*equal contribution).
15. Ling Zhang, Wenguang Liu, Lin Lin, **Dayong Chen** and Martina H. Stenzel, Degradable disulfide core-cross-linked micelles as a drug delivery system prepared from vinyl functionalized nucleosides via the RAFT process, *Biomacromolecules*, 9, 3321–3331 (2008).
16. Xiaoli Zhao, Wenguang Liu, **Dayong Chen**, Xiaoze Lin and William W. Lu, Effect of block order of ABA and BAB type NiPAAm/HEMA triblock copolymers on thermal responsive behavior of solutions, *Macromol. Chem. Phys.*, 208, 1773-1781 (2007).

Patents

1. **Dayong Chen**, Robert E. Cohen and Gareth H. McKinley, Robust Anti-Icing Polymer Coatings, U.S. Provisional Patent, in preparation, 2016.
2. Ryan Hayward, **Dayong Chen** and Bin Xu, Mechanically Gated Electrical Switches by Creasing of Patterned Metal/Elastomer Bilayer Films, US 2015/0294805 A1.

Invited Presentations

1. Mechanical Self-Assembly: A New Route to Functional Materials, University of Houston, Houston, TX, 4/21/2015

Contributed Presentations (8/16)

1. **Dayong Chen**, Gareth H. McKinley, Robert E. Cohen, Spontaneous Wettability Patterning via Creasing Instability, ACS Colloid & Surface Science Symposium, Pittsburgh, PA, 2015.
2. **Dayong Chen**, Michael F. Rubner, Robert E. Cohen, Gareth H. McKinley, Heterogeneously Wettable Surfaces via Creasing Instability, New England Workshop on the Mechanicals of Materials and Structures, Amherst, MA, 2014
3. **Dayong Chen**, Ryan C. Hayward, Creasing Instability of Hydrogels and Elastomers, MIT-Princeton Polymer Microsymposium, Princeton, NJ, 2014
4. **Dayong Chen**, Shengqiang Cai, Lihua Jin, Zhigang Suo and Ryan C. Hayward, Hysteresis in the Creasing Instability of Hydrogels and Elastomers, American Physical Society March Meeting, Baltimore, MD, 2013
5. **Dayong Chen** and Ryan C. Hayward, Creasing Instability of Elastomers under Uniaxial Compression, American Physical Society March Meeting, Boston, MA, 2012
6. **Dayong Chen**, Robert Hyldahl, Shelly Peyton, Priscilla Clarkson, Ryan Hayward, Harnessing the Creasing Instability of Hydrogels and Elastomers to Modulate Cell/Substrate Interactions, The Center of Excellence in Apoptosis Research Event, UMass-Amherst, MA, 2012
7. **Dayong Chen**, Jinwhan Yoon, Jungwook Kim and Ryan C. Hayward, Creasing Instability of Hydrogels and Elastomers, Gordon Research Conferences Macromolecular Materials, Ventura, CA, 2011
8. **Dayong Chen** and Ryan C. Hayward, Creasing Instability of Elastomers and Hydrogels, New England Workshop on the Mechanicals of Materials and Structures, Harvard University, MA, 2010

Awards

- Exxon Mobil-MIT Energy Fellow (2015)
- Nikon Small World Award (2013)
- Third Prize in Tianjin Undergraduates Math Contest in 2004
- Tianjin-Teda Scholarship (awarded to only top 20 undergraduates in Tianjin) (2003)
- University Excellent Student Scholarship (2002-2006)

Teaching Experience and Community Service

Mentor of Summer Undergraduate (REU) Students (UMass Amherst) (2010)

Mentor of Undergraduate Students on Cell Culture and Gene Delivery (Tianjin Univ) (2008)

Outreach activity to K12 students and high school art teachers (2012-2013)

Reviewer for Journals such as *Macromolecules*, *Soft Matter*, *Polymer Chemistry*, etc. (2013-Present)

Professional Affiliations

Member of American Physical Society	2011-present
Member of New England Workshop on the Mechanics of Materials and Structures	2010-present
Member of iMechanica	2012-present
Member of American Chemical Society	2015-Present
Member of Materials Research Society	2015-present