

CHARLES DHONG

EDUCATION AND PROFESSIONAL EXPERIENCE

Assistant Professor University of Delaware. Material Science and Engineering & Biomedical Engineering	Aug. 2019
Post Doctoral Researcher University of California, San Diego: Nanoengineering <i>Advisor:</i> Prof. Darren Lipomi	Jan. 2017- June 2019
Ph.D. Johns Hopkins University: Chemical and Biomolecular Engineering <i>Advisor:</i> Prof. Joelle Frechette	Aug. 2012- Nov. 2016
BS University of California, Berkeley: Chemical and Biomolecular Engineering	May 2012

RESEARCH AREAS

Our research seeks to measure and control mechanical forces at biological interfaces, ranging from the scale of cells to the human sense of touch. These biological interfaces are mechanically complex because they soft and patterned. We develop new devices and platforms to measure these forces and compliment experiments with theory and modeling. Our current areas of research focus around:

1. Understanding and replicating the mechanical forces which form the human sense of touch.
2. Measuring the mechanical properties of live cells and tissues in real-time and with high throughput.
3. Experimental evidence for soft matter phenomena around deformable fluid interfaces.

RESEARCH EXPERIENCE

Post-Doc in Nanoengineering, University of California, San Diego <i>Advisor:</i> Darren Lipomi <i>Research Areas:</i> Flexible, conductive polymers, graphene, haptics -Invented sensing method for particle measurements in fluids based on elasto-hydrodynamics and graphene -Discovered and designed experiments of how fine textures generate physical cues for the sense of touch	Jan. 2017 - Present
Ph.D in Chemical Engineering, Johns Hopkins University <i>Advisor:</i> Joelle Frechette <i>Research Areas:</i> Soft matter physics, adhesion, contact mechanics, fluid dynamics -Discovered how structured surfaces modify viscous forces using custom, underwater peeling apparatus -Developed novel numerical methods and theories of coupled phenomena in deformable, solid-fluid interfaces	Aug. 2012 – Oct. 2016
Undergraduate Chemical Engineering, University of California, Berkeley <i>Advisor:</i> Danielle Tullman-Ercek -Invented a heterologous fluorescent protein in <i>E. Coli</i> to monitor secretion efficiency for directed-evolution	2011-2012
Chemistry, University of California, Berkeley <i>Advisor:</i> Kristie A. Boering -Analyzed and processed N ₂ O isotopic data to understand global chemical cycles	2011-2012
Psychology, University of California, San Francisco <i>Advisor:</i> Timothy Carmody -Experienced with IRB and HIPPA for patient interviews and medical history for smoking cessation programs	2011-2012
Chemical Engineering, University of California, Berkeley <i>Advisor:</i> Roya Maboudian -Developed and characterized fabrication-free templating of nanowires using diblock copolymers	2009-2011

PUBLICATIONS

11. **Dhong, C.**[†] Miller, R.M., Root, N.B., Gupta, S., Kayser, L.V., Carpenter, C., Loh, K., Ramachandran, V.S., Lipomi, D.J.[‡] “Role of Indentation Depth and Contact Area on Human Perception of Softness for Haptic Interfaces”. *Accepted, Science Advances*.

†**Co-corresponding author**

10. **Dhong, C.**†, Kayser, L.V, Arroyo, R., Shin, A., Finn, M., Kleinschmidt, A.T, Lipomi, D.J.† (2018), "Role of fingerprint-inspired relief structures in elastomeric slabs for detecting frictional differences arising from surface monolayers". *Soft Matter*, **14**, 7483-7491.

†**Co-corresponding author**

9. **Dhong, C.**, Edmunds S.J., Ramirez, J., Kayser., L.V., Chen, F., Jokerst, J.V., Lipomi, D.J., (2018) "Optics-free, non-contact measurement of fluids, particles, and bubbles in microchannels using metallic nanoislands on graphene". *Nano Letters*, **18** (8), 5306-5311
8. Kayser, L.V., Russell, M.D., Rodriquez, D., Abuhamdieh, S.N., **Dhong, C.**, Khan, S., Stein, A.N., Ramirez, J. and Lipomi, D.J., (2018). "RAFT Polymerization of an Intrinsically Stretchable Water-Soluble Block Copolymer Scaffold for PEDOT." *Chemistry of Materials*, **30** (13), pp 4459–4468
7. Carpenter, C. W*., **Dhong, C***., Root, N. B*., Rodriquez, D., Abdo, E. E., Skelil, K., Alkhadra, M., Ramirez, J., Ramachandran., V.S., Lipomi, D. J. (2018). Human ability to discriminate surface chemistry by touch. *Materials Horizons*. **5** (1), 70-77

*These authors contributed equally to the work

6. **Dhong, C.**, & Fréchet, J. (2017). Peeling flexible beams in viscous fluids: Rigidity and extensional compliance. *Journal of Applied Physics*, **121**(4), 044906
5. Wang, Y., Pilkington, G. A., **Dhong, C.**, & Frechette, J. (2017). Elastic deformation during dynamic force measurements in viscous fluids. *Current Opinion in Colloid & Interface Science*, **27**, 43-49.
4. Ryu, B. K., **Dhong, C.**, & Fréchet, J. (2017). Rolling Spheres on Bioinspired Microstructured Surfaces. *Langmuir*, **33**(1), 164-175.
3. Wang, Y., **Dhong, C.**, & Frechette, J. (2015). Out-of-contact elastohydrodynamic deformation due to lubrication forces. *Physical Review Letters*, **115**(24), 248302.
2. **Dhong, C.**, & Fréchet, J. (2015). Coupled effects of applied load and surface structure on the viscous forces during peeling. *Soft Matter*, **11**(10), 1901-1910.
1. Doerk, G. S., **Dhong, C.**, Politi, C., Laboriante, I., Carraro, C., & Maboudian, R. (2011). Micellar block copolymer templated galvanic displacement for epitaxial nanowire device integration. *Journal of Materials Chemistry*, **21**(24), 8807-8815.

Patents

1. **Dhong, C.**, Edmunds S.J., Ramirez, J., Kayser., L.V., Chen, F., Jokerst, J.V., Lipomi, D.J., Non-contact measurements of fluids, particles and bubbles. U.S. Provisional 62/652,738

RESEARCH MENTEEES

Graduate Students

Beril Polat
Alexander Chen
Arianne Sevilla (now at Accenture)

Undergraduates

Samuel J. Edmunds*
Ryan Arroyo* (now at Northrup Grumman)
Andrew Shin* (now at Stanford)
Rachel Miller* (now at Cornell)

Mohammad A. Alkhadra* (now at MIT)
Kyle Skelil*
Eden Akile (now at Northwestern)
Brian Ryu* (NSF GRFP, now at Stanford)
Chris Argento (now at Biogen)

High Schoolers

Maire S. – Bryn Mawr
Kelly K. – Baltimore Polytechnic (Siemens Scholar)
*Denotes co-authorship on a paper

TEACHING EXPERIENCE

Guest lecturer for NANO134: Polymeric Materials

May 2018

Nanoengineering, University of California, San Diego

Undergraduate level, two guest lectures with original content. Overview and relevance of soft matter physics, molecular origins of viscoelasticity, and introduction into applications and theory of contact mechanics.

Course Planning and TA for EN.540.66: Nanobioengineering Laboratory

Jan-May 2015

Chemical and Biomolecular Engineering, Johns Hopkins University

Graduate-level laboratory course, including nanoparticle synthesis, characterization and group research projects. Helped plan inaugural course offering.

TA for EN.540.303: Fluid Dynamics/Transport (core undergraduate)

2013, 2014

Chemical and Biomolecular Engineering, Johns Hopkins University

Office hours, TA-led sections and guest lectures for first-semester fluid dynamics

SELECTED PRESENTATIONS

- “Effect of drainage channels on viscous forces during peeling” *Gordon Research Conference*, June 2015
- “Adhesion in flooded environments with drainage channels” *PSTC Invited Presentation*, May 2015

Oral Presentations *ACS National Meeting* (New Orleans, 2018), *Materials Research Society* (Boston, 2018), *American Physical Society* (Baltimore, 2016), *ACS Colloids and Surface Science* (Philadelphia, 2014)**Other Presentations** Elevator Pitch Competition (UCSD, 2018), *Gordon Research Conference*, *Science of Adhesion* (Poster, Mount Holyoke, 2015), Oral Presentation for Energy Efficiency and Sustainability Best Practices Awards (Office of the President, University of California, 2012)**Presentations by Mentees** *Materials Research Society* 2018 (Oral), *Materials Research Society* 2018 (Poster), *American Physical Society* 2016 (Poster), *Baltimore Polytechnic* (Oral)**LEADERSHIP POSITIONS, COMMUNITY SERVICE AND HONORS**

2016-2018	Volunteer, Association for Women in Science (AWIS)	San Diego, CA
2013-2016	Recruitment Chair, JHU Graduate Student Liaison Committee	Baltimore, MD
2015-2017	SABES (NSF program) Baltimore Elementary After-School Mentoring	Baltimore, MD
2013-2015	Teaching Assistant, JHU Chemical and Biomolecular Engineering	Baltimore, MD
2016	Pressure Sensitive Tape Council Poster Award	Baltimore, MD
2010-2011	AICHE Regional Liaison	Berkeley, CA
2010-2012	Project Coordinator, Alliance to Save Energy – Green Campus Program	Berkeley, CA
2008-2009	Residence Hall President	Berkeley, CA
2012	Energy Efficiency and Sustainability Best Practices Award Office of the President, University of California	Berkeley, CA
2012	Undergraduate Research Prize – College of Chemistry, UC Berkeley	Berkeley, CA
2011	The Green Initiative Fund, UC Berkeley	Berkeley, CA
2010	Brita Filter for Good Sustainability Grant	Berkeley, CA