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Yale University
Department of Biomedical Engineering
Department of Physics

- Career Objectives**
- To explore fundamental soft matter physics problems in the mechanics of biological materials
 - To pursue a career in research and teaching

- Education**
- **Ph.D.** Physics
Georgetown University, 2017
 - **M.S.** Physics
Georgetown University, 2014
 - **B.S.** Physics *cum laude*
Gonzaga University, 2011

- Positions Held**
- *Postdoctoral Associate*, Yale University, Department of Biomedical Engineering
June 2017 – current. Advisor: Michael P. Murrell
 - *Research Assistant*, Georgetown University, Department of Physics
June 2013 – May 2017. Advisor: Daniel L. Blair

**Publications -
Most to Least
Recent**

- V. Yadav, D. Banerjee, **A.P. Tabatabai**, D. Kovar, T. Kim, S. Banerjee, and M.P. Murrell, *Filament nucleation tunes mechanical memory in active polymer networks*, Advanced Functional Materials accepted 2019. **-Highlighted as VIP**
- V. Ajeti*, **A.P. Tabatabai***, A.J. Fleszar, M.F. Staddon, D.S. Seara, C. Suarez, M.S. Yousafzai, D. Bi, D. Kovar, S. Banerjee, and M.P. Murrell, *Wound healing coordinates actin architectures to regulate mechanical work*, Nature Physics (15) 2019.
- **A.P. Tabatabai**, B.P. Partlow, N.R. Raia, D.L. Kaplan, and D.L. Blair, *Silk molecular weight affects the kinetics of enzymatically crosslinked silk hydrogel formation*, Langmuir 34 (50) 2018.
- D.S. Seara, V. Yadav, I.A. Linsmeier, **A.P. Tabatabai**, P.W. Oakes, S.M.A. Tabei, S. Banerjee, and M.P. Murrell, *Entropy production rate is maximized in non-contractile actomyosin*, Nature Communications (9) 2018. **-Highlighted by Nature in Active Matter Collection**
- M.F. Staddon, D. Bi, **A.P. Tabatabai**, V. Ajeti, M.P. Murrell, and S. Banerjee, *Cooperation of dual modes of cell motility promotes epithelial stress relaxation to accelerate wound healing*, PLoS Computational Biology 14 (10) 2018.
- **A.P. Tabatabai**, K.M. Weigandt, and D.L. Blair, *Acid-induced assembly of a reconstituted silk protein system*, Physical Review E (96) 2017.
- B.P. Partlow*, **A.P. Tabatabai***, G.G. Leisk, P. Cebe, D.L. Blair, and D.L. Kaplan, *Silk fibroin degradation and its impact on mechanical properties*, Macromolecular Bioscience (16) 2016.
- **A.P. Tabatabai**, D.L. Kaplan, and D.L. Blair, *Rheology of reconstituted silk fibroin protein gels: the epitome of extreme mechanics*, Soft Matter (11) 2015. **-Highlighted in Silk and Silk-Inspired Materials Collection**

*These authors contributed equally

**Publications -
Under Review**

- W. Jung, **A.P. Tabatabai**, J.J. Thomas, S.M.A. Tabei, M.P. Murrell, and T. Kim, *Dynamic motions of molecular motors in the actin cytoskeleton*.

Teaching

- *Guest Instructor*, Yale University, Fall 2019
Introduction to Biomechanics, Physics 353
Role: Assist in lecturing and provide supplementary discussions on thermodynamics in biomechanics
- *Guest Instructor*, Yale University, Spring 2019

Molecular and Cellular Biomechanics, Engineering 556

Role: Helped lead peer-based discussions on original research based class curriculum, moderate student run journal club, and deliver lectures

- *Guest Lecturer, Yale University, Fall 2018*

Introduction to Biomechanics, Physics 353

Role: Provided lectures on thermodynamic and statistical mechanic approaches to polymer physics descriptions of biomolecules

- *Guest Lecturer, Yale University, Spring 2018*

Molecular and Cellular Biomechanics, Engineering 556

Role: Helped generate discussions and organize class-wide research assignments into coherent simulation based study, deliver lectures

- *Teaching Assistant, Georgetown University, Department of Physics*

September 2011 – May 2013

- *Teaching Assistant, Gonzaga University, Department of Physics*

September 2008 – May 2011

Mentorship

- Daniel Green and Zachary Sun, Yale PhD Candidates, 2019 – current

Controlling membrane nucleated actin growth with lipid phase separation

- Frank Fazekas, Yale Undergraduate, 2018 – 2019

Diffusion of semiflexible filaments within 2D nematics

- Joseph Tibbs, REU Undergraduate, 2018

Implementing a variable timestep in molecular dynamics simulations of the cytoskeleton

- Clare Singer, High School/University of Chicago Undergraduate, 2013/2014

Measuring the intrinsic viscosity of reconstituted silk fibroin

Awards

- Mayer Fellowship, Georgetown University, 2016

- Mayer Fellowship, Georgetown University, 2015

- NSF Research Experience for Undergraduates, Advisor: Daniel L. Blair, 2010

- NSF Research Experience for Undergraduates, Advisor: Jeffrey S. Olafsen, 2009

Communication Skills

- Mentoring both undergraduate and graduate students

- Explaining complicated scientific results and significance to a general audience

- Organizing and leading group discussions

Invited Talks

- YINQE Seminar, Yale University, February 2019

Force dependent binding kinetics and energy storage/dissipation within the cytoskeleton

- Soft Matter Day, University of Massachusetts Amherst, July 2018

What conserved physical principles govern the mechanical outputs of cells?

- Tufts University, March 2016

A silk protein's guide to aggregation

- George Mason University, March 2016

Associating microscope structure with mechanical properties in silk gels

- Technische Universität München, June 2015

From cocoon to gel: making silk based materials

Contributed Talks

- American Physical Society March Meeting, 2013, 2014, 2016, 2017, 2019

- 74th New England Complex Fluids, March 2018

- Multidisciplinary University Research Initiative - Traction Force Workshop, March 2018

- American Chemical Society Colloid and Surface Science Symposium, 2015, 2016

- Society of Rheology Annual Meeting, 2014

Poster Presentations

- Cancer Systems Biology at Yale, May 2019

- American Physical Society March Meeting 2019

- Yale Systems Biology Retreat, November 2018
- Cancer Systems Biology at Yale, May 2018
- Cancer Systems Biology at Yale- Flipped Science Fair, May 2018
- Multidisciplinary University Research Initiative, March 2018
- Yale Systems Biology Retreat, November 2017 –**poster award**
- Murdock Charitable Trust, 2010, 2011

- Proposals**
- Accepted, NIST Neutron Beam Time Proposal S32-21: 2.0 days of SANS
 - Accepted, NIST Neutron Beam Time Proposal U32-08: 6.0 days of USANS

- Schools/Workshops**
- An Introduction to Evidence-Based Undergraduate STEM Teaching, Summer 2019
 - Rheology of Dense Particulate Suspensions, Georgetown University, Summer 2016
 - SUPOLEN Workshop on Supramolecular Polymeric Assemblies, Capri Italy, Summer 2015
 - University of Delaware Colloidal Gel Day, January 2015
 - **Founder:** Georgetown Institute for Soft Matter Synthesis and Metrology Journal Club, 2014 – 2017
 - NIST Center for Neutron Research Fundamentals of Neutron Scattering, Summer 2014
 - Soft Solids and Complex Fluids, University of Massachusetts Amherst, Summer 2013
 - Mid-Atlantic Soft Matter Workshop, 2010 – 2017

- Active Collaborations**
- Shiladitya Banerjee, University College of London - Department of Physics
 - Taeyoon Kim, Purdue University - Department of Biomedical Engineering

- Research Topics**
- Nucleation and dynamics of actin networks (published/ongoing)
 - Energy utilization within cellular assemblies (published/ongoing)
 - Dissipation and storage of energy within the cytoskeleton (ongoing)
 - molecular dynamics simulations, practical biochemistry
 - Forces associated with wound healing (published)
 - cell culture, confocal microscopy
 - Associating microstructures of silk protein gels to mechanics (published)
 - rheology, neutron and light scattering, MATLAB[®]
 - Size separation of granular particles under shear
 - image analysis

- Service**
- Refereeing - Physical Review Letters
 - Refereeing - Physical Review E
 - Refereeing - Nature Physics (with Prof. Murrell)
 - Refereeing - Physical Review X (with Prof. Murrell)
 - Refereeing - Science Advances (with Prof. Murrell)