John D. (Jack) Treado

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Research Interests

Soft condensed matter · Biological physics · Disordered systems · Computational physics

Current position

2016 – *PhD Candidate*, Mechanical Engineering & Materials Science, Yale University
Thesis Advisor: Prof. Corey O'Hern

Education

2016 B.S. in Physics, *magna cum laude*, Georgetown University
Thesis Advisor: Prof. Peter Olmsted

Publications

D. Wang, **JDT**, A. Boromand, B. Norwick, M. P. Murrell, M. D. Shattuck, and C. S. O'Hern, "The structural, vibrational, and mechanical properties of jammed packings of deformable particles in three dimensions," *Soft Matter*, **17** 9901–9915 (2021).

JDT*, D. Wang*, A. Boromand, M. P. Murrell, M. D. Shattuck, and C. S. O'Hern, "Bridging particle deformability and collective response in soft solids," *Phys. Rev. Materials* **5** 055605 (2021).

Z. Mei, A. T. Grigas, **JDT**, G. Melendez Corres, M. Vuorte, M. Sammalkorpi, L. Regan, Z. A. Levine, and C. S. O'Hern, "Current MD forcefields fail to capture key features of protein structure fluctuations: A case study of cyclophilin A and T4 lysozyme," *arXiv preprint* arXiv:2012.03132, submitted to *Phys. Rev. E* (2021).

A. T. Grigas, Z. Mei, **JDT**, Z. A. Levine, L. Regan, and C. S. O'Hern, "Using physical features of protein core packing to distinguish real proteins from decoys," *Protein Science* **29** 1931 (2020).

Z. Mei*, **JDT***, A. T. Grigas, Z. A. Levine, L. Regan, and C. S. O'Hern, "Analyses of protein cores reveal fundamental differences between solution and crystal structures," *Proteins:*

Structure, Function, and Bioinformatics **88** 1154 (2020).

JDT, Z. Mei, L. Regan, and C. S. O'Hern, "Void distributions reveal structural link between jammed packings and protein cores," *Phys. Rev. E* **99** 022416 (2019).

C. Oi, **JDT**, Z. A. Levine, C. S. Lim, K. M. Knecht, Y. Xiong, C. S. O'Hern, and L. Regan, "A threonine zipper that mediates protein-protein interactions: Structure and prediction," *Protein Science* **27** 1969 (2018).

* denotes equal contribution

Talks

Invited

2021 APS March Meeting, *Virtual.* March 2021
Physics of Living Systems (PoLS) Seminar, *Virtual.* January 2021

2020 APS March Meeting, *Denver, CO (cancelled due to COVID-19).* March 2021

2019 4th International Conference on Packing Problems, *New Haven, CT.* June 2019

Contributed

2019 Yale Physical and Engineering Biology (PEB) retreat, *New Haven, CT.* October 2019
APS March Meeting, *Boston, MA.* March 2019

2018 PoLS Annual Meeting, Rice University, *Houston, TX.* July 2018
Northeastern Granular Materials Workshop, *New Haven, CT.* June 2018
APS March Meeting, *Los Angeles, CA.* March 2018

2017 APS March Meeting, *New Orleans, LA.* March 2017

Contributions to funded proposals

2021 *NSF PHYS-2102789*, "Modeling the Structural and Mechanical Properties of Tissue During Zebrafish Tailbud Elongation." Duration: 09-15-2021 to 08-31-2025

2020 *NSF CMMI-2029756*, "Biological Self Assembly: Tissue Mechanics of the Spongy Mesophyll in Flowers." Duration: 11-01-2020 to 10-31-2023

NSF CBET-2002782, "Collaborative Research: Experimental and Computational Studies of Flow and Clogging of Deformable Particles under Confinement." Duration: 05-15-2020 to 04-30-2023

Honors & Awards

2020 Yale Mechanical Enginering & Materials Science Goodyear Tire & Rubber Fellow
2018 Excellence in Poster Presentation, Granular Matter Gordon Research Seminar, *Stonehill College, MA*
2016 Georgetown University Physics Department Undergraduate Research Award
Paul A. Treado Medal
Honors in Physics

Professional Activites

2020 – Organizer, Physics of Living Systems student research conference, *postponed due to COVID-19*
2019 Selected participant, Beg Rohu Summer School. St. Pierre Quiberon, France.
Selected participant, Center for Physics of Biological Function symposia. New York, NY.
Public science publication, "Protein Folding: Nature's Rubik's Cube," *Hartford Courant*. May 2019
2019 – Co-founder, Yale BioSoftMatter journal club
2019 – Research mentor, Yale Physical Engineering Biology REU
2018 Public lecture, "Finding Patterns in Chaos: How Simple Rules Form Complex Behaviors," *Yale Science Diplomats*. Spring 2018

Teaching

Yale University

2021 PHYS 099: Intro to Research Methods, Teaching Assistant. Spring.
2020 MENG 383: Dynamics, Teaching Assistant. Fall.
MENG 472: Special Projects, Teaching Assistant. Spring.
PHYS 099: Intro to Research Methods, Teaching Assistant. Spring.
2019 ENAS 991: Integrated Workshop, Teaching Assistant. Fall.
ENAS 130: Introduction to Computing for Engineers and Scientists, Teaching Assistant. Spring.
2018 ENAS 991: Integrated Workshop, Teaching Assistant. Fall.
2017 ENAS 991: Integrated Workshop, Teaching Assistant. Fall.