Jordan L. Shivers

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Positions

2022 Kadanoff-Rice Postdoctoral Fellow
University of Chicago, Chicago, IL

Education

2022 **Ph.D.**, Chemical and Biomolecular Engineering, GPA: 4.07
Rice University, Houston, TX
Thesis: Phase transitions in the rheology of biopolymer networks
Advisor: Fred MacKintosh

2016 **B.S.E.** with Honors (*cum laude*), Chemical and Biological Engineering
Princeton University, Princeton, NJ
Thesis: Microfluidic immobilization and subcellular imaging of developing *C. elegans*
Advisor: Cliff Brangwynne

Awards and honors

2022 Ralph Budd Award for best Ph.D. thesis in engineering, *Rice University*
2021 Alexei Likhtman Poster Prize, *Edwards Symposium, University of Cambridge*
2021 Best Applied Paper, *American Institute of Chemical Engineers, South Texas Section*
2021 Society of Rheology Student Travel Grant
2020, 2021 NASA/Texas Space Grant Consortium Graduate Fellowship
2020 Lodieska Stockbridge Vaughn Fellowship, *Rice University*
2020 Sunit Patel '85 Endowed Fellowship for Research Accomplishment, *Rice University*
2018 Riki Kobayashi Fellowship in Chemical Engineering, *Rice University*
2018 Oil & Gas High Performance Computing Conference Fellowship, *Ken Kennedy Institute*

Preprints

13. **Shivers, J. L.**, Sharma, A. and MacKintosh, F. C. "Nonaffinity controls critical slowing down and rheology near the onset of rigidity." arxiv:2203.04891 (2022)

Peer-reviewed publications

12. Syed, S., MacKintosh, F. C., and **Shivers, J. L.** "Structural Features and Nonlinear Rheology of Self-Assembled Networks of Cross-Linked Semiflexible Polymers." *Journal of Physical Chemistry B*, 126 (2022), 10741–10749. DOI: 10/grd3w3

11. Ferretti, F., Grosse-Holz, S., Holmes, C., **Shivers, J. L.**, Giardina, I., Mora, T., and Walczak, A. "Signatures of irreversibility in microscopic models of flocking." *Physical Review E*, 106 (2022), 034608. DOI: 10/jgx5

10. Pogoda, K., Byfield, F., Deptula, P., Cieśluk, M., Suprewicz, L., Sk lodowski, K., **Shivers, J. L.**, van Oosten, A., Cruz, K., Tarasovetc, E., Grischuk, E. L., MacKintosh, F. C., Bucki, R., Patteson, A. E. and Janmey, P. A. "Unique Role of Vimentin Networks in Compression Stiffening of Cells and Protection of Nuclei from Compressive Stress." *Nano Letters*, 22 (2022), 4725–4732. DOI: 10/gqt3jr

9. Arzash, S., **Shivers, J. L.** and MacKintosh, F. C. "Shear-induced phase transition and critical exponents in three-dimensional fiber networks." *Physical Review E*, 104 (2021), L022402. DOI: 10/gqt3ws

8. Song, D., **Shivers, J. L.**, MacKintosh, F. C., Patteson, A. E. and Janmey, P. A. "Cell-induced confinement effects in soft tissue mechanics." *Journal of Applied Physics*, 129 (2021), 140901. DOI: 10/gm4h8p

7. **Shivers, J. L.**, Feng, J., van Oosten, A. S. G., Levine, H., Janmey, P. A. and MacKintosh, F. C. "Compression stiffening of fibrous networks with stiff inclusions." *Proceedings of the National Academy of Sciences*, 117 (2020), 21037-21044. DOI: 10/gqt4cn

6. Arzash, S., **Shivers, J. L.** and MacKintosh, F. C. "Finite size effects in critical fiber networks." *Soft Matter*, 16 (2020), 6784-6793. DOI: 10/gqt4cp

5. **Shivers, J. L.**, Arzash, S. and MacKintosh, F. C. "Nonlinear Poisson effect governed by a mechanical critical transition." *Physical Review Letters*, 124 (2020), 038002. DOI: 10/gqt4cm

4. **Shivers, J. L.**, Arzash, S., Sharma, A. and MacKintosh, F. C. "Scaling theory for mechanical critical behavior in fiber networks." *Physical Review Letters*, 122 (2019), 188003. DOI: 10/gqt4ck

3. Arzash, S., **Shivers, J. L.**, Licup, A. J., Sharma, A. and MacKintosh, F. C. "Stress-stabilized subisostatic rope networks." *Physical Review E*, 99 (2019), 042412. DOI: 10/gqt34p

2. **Shivers, J. L.**, Feng, J., Sharma, A. and MacKintosh, F. C. "Normal stress anisotropy and marginal stability in athermal elastic networks." *Soft Matter*, 15 (2019), 1666-1675. DOI: 10/gqt34q

1. **Shivers, J.**, Uppaluri, S. and Brangwynne, C. P. "Microfluidic immobilization and subcellular imaging of developing *Caenorhabditis elegans*." *Microfluidics and Nanofluidics*, 21 (2017), 149. DOI: 10/gbx9s7

Invited talks

Oct. 2021	Strain-induced critical slowing of stress relaxation in elastic networks *Soft Matter For All Symposium (virtual), University of Delaware and Princeton MRSEC*
Nov. 2020	Compression stiffening of fibrous networks with stiff inclusions *Patel Award Seminar (virtual), Rice University Chemical Engineering, Houston, TX*
Oct. 2020	Compression stiffening of fibrous networks with stiff inclusions *University of Pennsylvania MRSEC IRG2 Weekly Talks (virtual), Philadelphia, PA*
Nov. 2019	Mechanics of semiflexible polymer network materials *Kobayashi Award Seminar, Rice University Chemical Engineering, Houston, TX*

Contributed talks

Oct. 2022	Nonaffinity-induced critical slowing down in fibrous networks and dense suspensions *Society of Rheology 93rd Annual Meeting, Chicago, IL*
Aug. 2022	Strain-induced critical slowing of stress relaxation in disordered networks *Texas Soft Matter Meeting, Austin, TX*
Jun. 2022	Strain-induced critical slowing of stress relaxation in disordered networks *US National Congress on Theoretical and Applied Mechanics Austin, TX*
May 2022	Strain-induced critical slowing of stress relaxation in disordered networks *International Physics of Living Systems Annual Meeting, Montpellier, France*
Mar. 2022	Strain-induced critical slowing of stress relaxation in disordered networks *APS March Meeting, Chicago, IL*
Nov. 2021	Compression stiffening of fibrous networks with stiff inclusions *AIChE Annual Meeting, Boston, MA*

Oct. 2021	Strain-induced critical slowing of stress relaxation in elastic networks *Society of Rheology 92nd Annual Meeting, Bangor, ME*
Mar. 2021	Compression stiffening of fibrous networks with stiff inclusions *APS March Meeting (virtual)*
Dec. 2020	Compression stiffening of fibrous networks with stiff inclusions *International Congress on Rheology (virtual), Rio de Janeiro, Brazil*
Mar. 2020	Nonlinear Poisson effect in critical mechanical networks *APS March Meeting (virtual), Denver, CO*
Feb. 2020	Nonlinear Poisson effect in critical mechanical networks *Smalley-Curl Institute Transdisciplinary Symposium, Houston, TX*
Oct. 2019	Nonlinear Poisson effect in critical mechanical networks *Society of Rheology 91st Annual Meeting, Raleigh, NC*
Mar. 2019	Scaling theory for critical mechanical behavior in fiber networks *APS March Meeting, Boston, MA*
Oct. 2018	Scaling theory for critical mechanical behavior in fiber networks *Society of Rheology 90th Annual Meeting, Houston, TX*
Jun. 2018	Mechanics of fibrous networks with embedded inclusions *International Physics of Living Systems Annual Meeting, Houston, TX*
Mar. 2018	Anomalous normal stress controlled by marginal stability in fiber networks *APS March Meeting, Los Angeles, CA*

Contributed posters

Sep. 2021	Strain-induced critical slowing of stress relaxation in elastic networks *5th Edwards Symposium, Edwards Centre for Soft Matter, Cambridge, UK*
Aug. 2019	Nonlinear Poisson effect in critical mechanical networks *Gordon Research Conference on Soft Condensed Matter Physics, New London, NH*
Jun. 2019	Nonlinear Poisson effect in critical mechanical networks *Boulder Summer School for Condensed Matter and Materials Physics, Boulder, CO*
Jun. 2019	Nonlinear Poisson effect in critical mechanical networks *International Soft Matter Conference, Edinburgh, UK*
Mar. 2019	Nonlinear Poisson effect in critical mechanical networks *APS March Meeting, Boston, MA*

External courses

2019	Boulder School for Condensed Matter and Materials Physics *Topic: Theoretical Biophysics (3 weeks)*

Teaching

Spring 2019	Teaching Assistant, Rice Univerity, CHBE 603: Rheology
Fall 2017	Teaching Assistant, Rice Univerity, CHBE 401: Transport Phenomena I
Spring 2017	Teaching Assistant, Rice Univerity, CHBE 402: Transport Phenomena II
Fall 2016	Teaching Assistant, Rice Univerity, CHBE 403: Design Fundamentals

Professional activities

2019–present	**Journal referee**, *Physical Review Letters, Physical Review X, Proceeding of the National Academy of Sciences, Biophysical Journal, Soft Matter, Macromolecules, Acta Biomaterialia*

Service

2021–2022	Research mentor for one undergraduate student *Frontiers in Science REU Program, Center for Theoretical Biological Physics*

2021	Volunteer physics tutor *NEWT K-12 Tutoring Program, Rice University*
2017-2018	Graduate recruitment co-chair *Chemical Engineering Graduate Student Association, Rice University*
2017-2019	Residential college graduate fellow *Duncan College, Rice University*
2017-2018	Member, Dean's Engineering Student Advisory Council *School of Engineering, Rice University*
2017	Judge for undergraduate research presentations *Gulf Coast Undergraduate Research Symposium, Rice University*

Skills

Programming: C/C++, Python, Java, Mathematica, MATLAB, R, LaTeX