Daniel Hexner
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Academic Appointments

Senior Lecturer *2019-present*
Faculty of Mechanical Engineering, Technion –
Israel Institute of Technology.

Postdoctoral Researcher *2015-2019*
University of Chicago & University of Pennsylvania

Academic Degrees

PhD, Doctor of Philosophy in Physics *2010-2015*
Technion, Haifa, Israel.

M.Sc., Master of Science in Physics *2006-2009*
Technion, Haifa, Israel.

B.A., Bachelor of Arts in Physics *2003-2006*
Technion, Haifa, Israel - Graduated Summa Cum Laude.

Research interests

- Trainable materials: materials that can be taught a desired functionality.
- Analogs of machine learning in mechanical systems.
- Exotic orderings, e.g., hyperuniformity.
- Elasticity of amorphous solids.
- Disordered packings, and jamming.

Fellowships Awards and Honors

- BSF Travel Grant for Young Scientists (2012).
- B.A. Summa Cum Laude (2006).

Teaching Experience

Teaching Assistant *2010-2015*
Department of Physics, Technion – Haifa, Israel
- Introduction to statistical mechanics (undergraduate course)
- Advanced course in Statistical Mechanics (graduate course).

Lab instructor (undergraduate) *2006-2009*
Department of Physics, Technion – Haifa, Israel
- **Lab2M**: Electricity and Magnetism.
- **Lab4**: Modern physics, Semiconductors, Optics and ESR.

Public Professional Activities

Referee for: Nature communication, PNAS, Science Advances, Phys. Rev. Lett., Phys. Rev. E, Euro. Phys. Lett, Soft-Matter.

Conferences

Invited talks:

- Princeton Center for Theoretical Science Workshop on (2016) on "Hyperuniform State of Matter in Physics, Mathematics and Biology". Title: Hyperuniformity from non-equilibrium dynamics.
- APS March meeting 2016, Baltimore, USA, Title: Unusual Fluctuations in Absorbing State Models.

Contributed talks:

- APS March meeting, Boston, USA, March 2019. Title: Can a large jammed packing be assembled from a smaller one ?
- APS March meeting, Los-Angeles, USA, March 2018. Title: A diverging length scale in the structure of jammed systems.
- APS March meeting, New-Orleans, USA, March 2017. Title: The central role of the effective non-local spring constant in disordered networks.

Publications

Theses

1. M.Sc: Tug-of-War in Motility Assay Experiments (2009).
2. Ph.D: Spatial Organization in Periodically Driven Systems (2015).

Refereed papers in professional journals

1. D. Hexner and Y. Kafri "Tug of war in motility assay experiments". *Phys. Biol.* **6** 036016 (2009).
2. N. Nikola, D. Hexner, and D. Levine "Entropic commensurate-incommensurate transition ". Phys. Rev. Lett. 110, 125701 (2013)
3. D. Hexner and D. Levine "Self-Organization and Self Avoiding Limit Cycles", EPL, 109 (2015) 30004 (Editor's choice)
4. D. Hexner and D. Levine "Hyperuniformity of critical absorbing states" Phys. Rev. Lett. 114, 110602 (2015)
5. D. Hexner and D. Levine "Noise, Diffusion, and Hyperuniformity", Phys. Rev. Lett. 118, 020601 (2017)
6. D. Hexner, P. M. Chaikin, and D. Levine "Enhanced hyperuniformity from random reorganization", PNAS 114 4294-4299 (2017)
7. D. M. Sussman, D. Hexner, C. P. Goodrich and A. J. Liu - Reply to the 'Comment on "Spatial structure of states of self-stress in jammed systems"' by E. Lerner, Soft Matter 13 (2017)
8. D. Hexner, A. J. Liu, and S. R. Nagel "Linking microscopic and macroscopic response in disordered solids" Phys. Rev. E 97, 063001 (2018)
9. N. P. Mitchell, L. M. Nash, D. Hexner, A. M. Turner and W. T. M. Irvine "Amorphous topological insulators constructed from random point sets" Nature Physics 14 380–385 (2018)

10. D. Hexner, A. J. Liu, and S. R. Nagel “Role of local response in manipulating the elastic properties of disordered solids by bond removal” Soft Matter 14, 312-318 (2018)
11. D. Hexner, A. J. Liu, and S. R. Nagel “Two diverging length scales in the structure of jammed packings” Phys. Rev. Lett. 121, 115501 (2018)
    Highlighted in Journal Club for Condensed Matter Physics (https://www.condmatjclub.org).
12. D. Hexner, P. Urbani and F. Zamponi “Can a large packing be assembled from smaller ones ?”. Phys. Rev. Lett. 123, 068003 (2019).
    Highlighted in Journal Club for Condensed Matter Physics (https://www.condmatjclub.org).
13. N. Pashine*, D. Hexner*, A. J. Liu and S.R. Nagel “Nature’s greed, memory and directed aging”. (*equal contribution) Science advance (2019). In Press.

Preprints

1. D. Hexner, N. Pashine, A. J. Liu, S. R. Nagel, “Effect of aging on the non-linear elasticity and memory formation in materials” arXiv:1909.00481 (2019).
2. D. Hexner, A. J. Liu, S. R. Nagel, “Periodic training of creeping solids” arXiv:1909.03528 (2019).