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Education

Brown University
Ph.D., Mechanical Engineering (Advisor: Prof. Huajian Gao) 2008–2014

Peking University
M.S., Mechanical Engineering 2005–2008
B.Eng., Mechanical Engineering 2001–2005

Employment

Peking University, Assistant Professor, College of Engineering 11/2016–present
Dartmouth College, Postdoctoral Associate 07/2016–11/2016
(working with Prof. Zi Chen)
Brown University, Postdoctoral Associate 2014–06/2016
(working with Prof. Huajian Gao)

Research Interests

Micromechanics; Cell mechanics; Mechanics of soft matter

Teaching

For undergraduates

- Strength of Materials (Spring'18, Spring'19)

For graduates

- Introduction to Biophysics (Fall'17), Applied Mathematics for Biomedicine (Fall'18),

Professional Activities

Reviewer for *ACS Nano*, *Acta Mechanica Sinica*, *Advanced Science*, *Biomaterials Science*, *Carbon*, *Chinese Journal of Theoretical and Applied Mechanics*, *International Journal of Solids and Structures*, *Journal of Applied Physics*, *Journal of Engineering Mathematics*, *Journal of Materials Chemistry B*, *Journal of Mechanics of Materials and Structures*, *Journal of the Mechanics of Physics and Solids*, *Langmuir*, *Nanoscale*, *Nanoscale Horizons*, *New Journal of Chemistry*, *Physics Letters A*, *Physical Review Letters*, *Science China Technological Sciences*, *Scientific Reports*, *Small*, and *Soft Matter*.

Journal Publications (*corresponding author)

36 T. T. Yue, H. Y. Zhou, H. N. Sun, X. R. Zhang, D. P. Cao, S. X. Li, **X. Yi***, and B. Yan*, Why nanoparticles are trapped at cell junctions when cell density is high? *Nanoscale* (2019).

35 M. R. Yu†, W. Y. Song†, F. L. Tian†, Z. Dai, Q. L. Zhu, E. Ahmad, S. Y. Guo, C. L. Zhu, H. J. Zhong, Y. C. Yuan, T. Zhang, **X. Yi**, X. H. Shi*, Y. Gan*, and H. J. Gao*, Temperature- and rigidity-mediated rapid transport of lipid nanovesicles in hydrogels. *Proceedings of the National Academy of Sciences of the U. S. A.* (2019). (†equal contribution)

34 W. B. Liu, L. R. Chen, Y. Y. Cheng, L. Yu, **X. Yi**, H. J. Gao, and H. L. Duan*, Model of nanoindentation size effect incorporating the role of elastic deformation. *Journal of the Mechanics and Physics of Solids* 126, 245–255 (2019).

33 Z. M. Wu, H. Y. Yuan, X. Y. Zhang, and **X. Yi***, Sidewall contact regulating the nanorod packing inside vesicles with relative volumes. *Soft Matter* (2019).

32 S. X. Li, Z. S. Yan, Z. Luo, Y. Xu, F. Huang, X. R. Zhang, **X. Yi***, and T. T. Yue*, Mechanics of the formation, interaction and evolution of membrane tubular structures. *Biophysical Journal* 116(5), 884–892 (2019).

31 X. Y. Li, J. M. Zhang*, **X. Yi***, Z. Y. Huang, P. Y. Lv, and H. L. Duan, Multimaterial microfluidic 3D printing of textured composites with liquid inclusions. *Advanced Science* 6(3), 1800730 (2019).

30 Z. Q. Shen, H. L. Ye, **X. Yi**, and Y. Li*, Membrane wrapping efficiency of elastic nanoparticles during endocytosis: Size and shape matter. *ACS Nano* 13(1), 215–228 (2019).

29 **X. Yi***, G. J. Zou, and H. J. Gao*, Mechanics of cellular packing of nanorods with finite and non-uniform diameters. *Nanoscale* 10(29), 14090–14099 (2018).

28 G. J. Zou, **X. Yi**, W. P. Zhu, and H. J. Gao*, Packing of flexible 2D materials in vesicles. *Journal of Physics D: Applied Physics* 51(22), 224001 (2018).

27 B. Marzban, **X. Yi**, and H. Y. Yuan*, A minimal mechanics model for mechanosensing of substrate rigidity gradient in durotaxis. *Biomechanics and Modeling in Mechanobiology* 17(3), 915–922 (2018).

26 F. L. Tian, T. T. Yue, W. Dong, **X. Yi***, and X. R. Zhang*, Size-dependent formation of membrane nanotubes: continuum modeling and molecular dynamics simulations. *Physical Chemistry Chemical Physics* 20(5), 3474–3483 (2018).

25 G. J. Zou, **X. Yi**, W. P. Zhu, and H. J. Gao*, Packing of flexible nanofibers in vesicles. *Extreme Mechanics Letters* 19, 20–26 (2018).

24 **X. Yi** and H. J. Gao*, Budding of an adhesive elastic particle out of a lipid vesicle. *ACS Biomaterials Science & Engineering* 3(11), 2954–2961 (2017).

23 **X. Yi** and H. J. Gao*, Kinetics of receptor-mediated endocytosis of elastic nanoparticles. *Nanoscale* 9(1), 454–463 (2017).

22 **X. Yi** and H. J. Gao*, Incorporation of soft particles into lipid vesicles: Effects of particle size and elasticity. *Langmuir* 32(49), 13252–13260 (2016).

21 W. P. Zhu†, A. von dem Bussche†*, **X. Yi**†, Y. Qiu, Z. Y. Wang, P. Weston, R. H. Hurt, A. B. Kane, and H. J. Gao*, Nanomechanical mechanism for lipid bilayer damage induced by carbon nanotubes confined in intracellular vesicles. *Proceedings of the National Academy of Sciences of the U. S. A.* 113(44), 12374–12379 (2016). (†equal contribution)

20 Z. Y. Wang, W. P. Zhu, Y. Qiu, **X. Yi**, A. von dem Bussche, A. Kane*, H. J. Gao*, K. Koski*, and R. Hurt*, Biological and environmental interactions of emerging two-dimensional

nanomaterials. *Chemical Society Reviews* 45(6), 1750–1780 (2016).

19 **X. Yi** and H. J. Gao*, Cell interaction with graphene microsheets: Near-orthogonal cutting versus parallel attachment. *Nanoscale* 7(12), 5457–5467 (2015).

18 **X. Yi** and H. J. Gao*, Cell membrane wrapping of a spherical thin elastic shell. *Soft Matter* 11(6), 1107–1115 (2015).

17 **X. Yi** and H. J. Gao*, Phase diagrams and morphological evolution in wrapping of rod-shaped elastic nanoparticles by cell membrane: A two-dimensional study. *Physical Review E* 89(6), 062712 (2014).

16 **X. Yi**, X. H. Shi, and H. J. Gao*, A universal law for cell uptake of one-dimensional nanomaterials. *Nano Letters* 14(2), 1049–1055 (2014).

15 **X. Yi**, X. H. Shi, and H. J. Gao*, Cellular uptake of elastic nanoparticles. *Physical Review Letters* 107(9), 098101 (2011).
Erratum: Cellular uptake of elastic nanoparticles [Phys. Rev. Lett. 107, 098101 (2011)]. *Physical Review Letters* 121(19), 199902 (2018).

14 B. X. Jing, J. Zhao*, Y. Wang, **X. Yi**, and H. L. Duan*, Water-swelling-induced morphological instability of a supported polymethyl methacrylate thin film. *Langmuir* 26(11), 7651–7655 (2010).

13 H. L. Duan*, Y. H. Xue, and **X. Yi**, Vibration of cantilevers with rough surfaces. *Acta Mechanica Solida Sinica* 22(6), 550–554 (2009).

12 **X. Yi** and H. L. Duan*, Surface stress induced by interactions of adsorbates and its effect on deformation and frequency of microcantilever sensors. *Journal of the Mechanics and Physics of Solids* 57(8), 1254–1266 (2009).

11 **X. Yi**, H. L. Duan, Y. Chen, and J. X. Wang*, Prediction of complex dielectric constants of polymer-clay nanocomposites. *Physics Letters A* 372(1), 68–71 (2007).

10 **X. Yi**, H. L. Duan, B. L. Karihaloo, and J. X. Wang*, Eshelby formalism for multi-shell nano-inhomogeneities. *Archives of Mechanics* 59(3), 259–281 (2007).

9 H. L. Duan, **X. Yi**, Z. P. Huang, and J. X. Wang*, A unified scheme for prediction of effective moduli of multiphase composites with interface effects. Part I: Theoretical framework. *Mechanics of Materials* 39(1), 81–93 (2007).

8 H. L. Duan, **X. Yi**, Z. P. Huang, and J. X. Wang*, A unified scheme for prediction of effective moduli of multiphase composites with interface effects: Part II—Application and scaling laws. *Mechanics of Materials* 39(1), 94–103 (2007).

7 H. L. Duan, **X. Yi**, Z. P. Huang, and J. X. Wang*, Eshelby equivalent inclusion method for composites with interface effects. *Key Engineering Materials* 312, 161–166 (2006).

6 H. L. Duan, Y. Jiao, **X. Yi**, Z. P. Huang, and J. X. Wang*, Solutions of inhomogeneity problems with graded shells and application to core-shell nanoparticles and composites. *Journal of the Mechanics and Physics of Solids* 54(7), 1401–1425 (2006).

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4 H. L. Duan, B. L. Karihaloo*, J. X. Wang, and **X. Yi**, Compatible composition profiles and critical sizes of alloyed quantum dots. *Physical Review B* 74(19), 195328 (2006).

3 J. X. Wang*, H. L. Duan, and **X. Yi**, Bounds on effective conductivities of heterogeneous

media with graded constituents. *Physical Review B* 73(10), 104208 (2006).

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1 H. L. Duan, B. L. Karihaloo*, J. X. Wang, and **X. Yi**, Strain distributions in nano-onions with uniform and non-uniform compositions. *Nanotechnology* 17(14), 3380–3387 (2006).