

Zhaohe Dai

[Personal website](#)

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CURRENT POSITION

Assistant Professor

03/30/2022 – present

Department of Mechanics and Engineering Science, Peking University, Beijing, China

EDUCATION

Ph.D. in Engineering Mechanics

09/01/2016 – 05/23/2020

Department of Engineering Mechanics, The University of Texas at Austin (UT Austin), Austin, United States

M.S. in Solid Mechanics

09/01/2013 – 06/01/2016

Institute of Mechanics, University of Chinese Academy of Sciences (UCAS), Beijing, China

B.S. in Theoretical and Applied Mechanics

08/15/2009 – 06/01/2013

Department of Modern Mechanics, University of Science and Technology of China (USTC), Hefei, China

RESEARCH EXPERIENCE

Postdoctoral research associate

09/21/2020 – 03/12/2022

University of Oxford, Oxford, United Kingdom

Research topic: Van der Waals wetting and dewetting (with Prof. [Dominic Vella](#))

Sponsored by Marie Skłodowska-Curie individual fellowship.

Research assistant

09/01/2016 – 05/20/2020

UT Austin, Austin, United States

Research topic: Out-of-plane deformations of 2D materials (with Prof. [Nanshu Lu](#))

Research assistant

09/01/2013 – 06/01/2016

Institute of Mechanics, CAS, Beijing, China

Research topic: Shear of graphene-based interfaces (with Prof. [Yueguang Wei](#))

Joint research assistant

07/01/2012 – 06/01/2016

National Center for Nanoscience and Technology (NCNST), CAS, Beijing, China

Research topic: Fabrications and characterizations of graphene films and sponges (with Prof. [Zhong Zhang](#))

RESEARCH INTERESTS

My research experiences have allowed me to acquire knowledge in several general areas of mechanics and materials. The associated keywords may include thin film mechanics, surface phenomena, interface mechanics, 2D materials, strain-coupled physics, and nanocarbon-based composites. Most of my published works have concerned with the mechanics of thin solids and liquids, particularly focusing on elasticity metrology, elastocapillarity, wrinkling instability, adhesion, and friction. In general, I am interested in understanding various aspects of how slender solids deform when interacting with other objects, including liquids, and rigid and deformable substrates.

TALKS

Invited talks

1. Z. Dai. “[Peeling by Pulling: Characterizing the Mechanical Behavior of Nanoscale Thin Films](#)”, ICCES2023, Shenzhen. May 2023
2. Z. Dai. “[Adhesion mechanics of ultra-thin films](#)”, Zhejiang University, Hangzhou. March 2023
3. Z. Dai. “[Wetting on thin, deformable boundaries: From graphene to lubricated surfaces](#)”, Frontiers in X-mechanics. Nanjing, April 2023

4. Z. Dai. "Adhesion mechanics of atomically thin materials", Nanyang Technological University, Singapore. March 2023
5. Z. Dai. "Elastocapillarity of nanofilms", Wuhan University, Wuhan. Feb. 2023
6. Z. Dai. "Elastocapillarity of nanofilms", University of Science and Technology of China, Hefei. Feb. 2023
7. Z. Dai. "Elastocapillarity of 2D materials", National Center for NanoScience and Technology, Beijing. Nov. 2022
8. Z. Dai. "Wetting on thin deformable boundaries", Peking University, Beijing. Aug. 2022
9. Z. Dai. "Statics and dynamics of droplets on lubricated surfaces", Mathematical Institute (University of Oxford), April. 2022 (online)
10. Z. Dai. "Elastocapillarity of 2D materials", CAS Institute of Mechanics, Beijing. April 2022
11. Z. Dai. "Slippery problems for 2D materials", North meets South colloquium, Mathematical Institute, Oxford. Oct. 2020
12. Z. Dai. "Mechanics of Atomically Thin Films – 2D Materials", Dalian University of Technology, Dalian. Jan. 2019

Conference talks

1. Z. Dai, D. Vella. "Statics and dynamics of droplets on lubricant infused surfaces", APS March Meeting 2022 (Video presentation)
2. Z. Dai, N. Lu. "Radial Buckle Delamination around 2D Material Tents", Chinese Congress of Theoretical and Applied Mechanics (CCTAM), Hangzhou, Aug. 2019
3. Z. Dai, N. Lu, R. Huang, L. Liu, Z. Zhang. "Characterizing the interfacial behavior of 2D materials", CCTAM, Hangzhou, Aug. 2019
4. Z. Dai, N. Lu, R. Huang, L. Liu, Z. Zhang. "On the interaction between elasticity and interface energy of 2D materials", CCTAM, Hangzhou, Aug. 2019
5. Z. Dai, G. Wang, N. Lu, R. Huang, L. Liu, Z. Zhang. "Characterizing the Interfacial Behavior of Graphene", CHINANANO 2019, Beijing, Aug. 2019
6. Z. Dai, N. Lu, R. Huang, L. Liu, Z. Zhang. "On the interaction between elasticity and interface energy of 2D materials", CHINANANO 2019, Beijing, Aug. 2019
7. Z. Dai. "Trade-off between Boron Doping and Stiffness, Strength and Damage Tolerance of Graphene", ASME's International Mechanical Engineering Congress and Exposition (IMECE 2018), Pittsburgh, PA. Nov. 2018
8. Z. Dai, N. Lu. "Understanding the Bending Behaviors of Multilayer 2D Materials", ASME's International Mechanical Engineering Congress and Exposition (IMECE 2018), Pittsburgh, PA. Nov. 2018
9. Z. Dai. "Strain Engineering of 2D Materials: The Essential Role of Interface", ASME's International Mechanical Engineering Congress and Exposition (IMECE 2018), Pittsburgh, PA. Nov. 2018
10. Z. Dai, D. Sanchez, N. Lu. "Mechanics of Nanobubbles and Nanotents Formed by Two-Dimensional Materials", 18th U.S. National Congress of Theoretical and Applied Mechanics (USNC/TAM), Chicago, IL. June 2018.
11. Z. Dai, D. Sanchez, P. Wang, R. Huang, N. Lu. "Experimental Measurements and Mechanics Modeling of Liquid-filled Blisters Covered by 2D Materials", 54th Annual Technical Meeting of the Society of Engineering Science (SES), Boston, MA. July 2017.
12. Z. Dai, L. Liu, Z. Zhang, Y. Wei. "Macroscopic Assemblies of Carbon Nanomaterials: interfaces and structures", Annual academic report of State Key Laboratory of Nonlinear Mechanics, Beijing, Dec. 2015.
13. Z. Dai, G. Wang, L. Liu, Y. Wei, Z. Zhang. "Graphene-polymer interfaces under shear", The Chinese Congress on Theoretical and Applied Mechanics, Shanghai, Aug. 2015.
14. Z. Dai, L. Liu, Z. Zhang. "Biomimetic Structures and Properties of Macroscopic Assemblies of Carbon Nanomaterials", NCNST, Beijing, Jan. 2015.
15. Z. Dai, L. Liu, Z. Zhang. "Creep of Multi-Walled Carbon Nanotubes-Polycarbonate Nanocomposite Fibers at High Temperature", Symposium on Mechanics of Composites, Chongqing, May 2013.

PUBLICATIONS

Note: † denotes equal contribution, * stands for correspondence; H-index of all publications is 34 and the total number of citations is 4480, according to Google Scholar as of June 2024.

Reviews:

1. W. Dong, Z. Dai*, L. Liu*, Zhong Zhang. Toward clean 2D materials and devices: Recent progress in transfer and cleaning methods. *Advanced Materials* 2303014 (2024)

- <https://doi.org/10.1002/adma.202303014>
- D. Sanchez, **Z. Dai**, N. Lu*. 2D Material Bubbles: Fabrication, Characterization, and Applications. **Trends in Chemistry** 3, 204 (2021)
<https://doi.org/10.1016/j.trechm.2020.12.011>
 - Z. Dai**, N. Lu, K. Liechti, R. Huang*. Mechanics at the Interfaces of 2D Materials: Challenges and Opportunities. **Current Opinions in Solid State & Materials Science** 24, 100837 (2020)
<https://doi.org/10.1016/j.cossms.2020.100837>
 - Z. Dai**, L. Liu*, Z. Zhang*. Strain Engineering of Two-Dimensional Materials: Issues and Opportunities at the Interface. **Advanced Materials** 31, 1805417 (2019)
<https://doi.org/10.1002/adma.201805417>
-ESI highly cited paper; Selected as the journal [Frontispiece](#).

Selected articles:

- Z. Dai** and D. Vella*. Droplets on Lubricant Infused Surfaces: The slow dynamics of skirt formation. **Physical Review Fluids** 7, 054003 (2022)
<https://doi.org/10.1103/PhysRevFluids.7.054003>
- Z. Dai***, N. Lu*. Poking and bulging of suspended thin sheets: slippage, instabilities, and metrology. **Journal of the Mechanics and Physics of Solids** 149, 104320 (2021)
<https://doi.org/10.1016/j.jmps.2021.104320>
- Z. Dai**, D. Sanchez, C. J. Brennan, N. Lu*. Radial Buckle Delamination Around Two-Dimensional Material Tents. **Journal of the Mechanics and Physics of Solids** 137, 103843 (2020)
<https://doi.org/10.1016/j.jmps.2019.103843>
- G. Wang†, **Z. Dai†**, J. Xiao†, S. Feng, C. Weng, L. Liu*, Z. Xu*, R. Huang*, Z. Zhang*. Bending of multilayer van der Waals materials. **Physical Review Letters** 123, 116101 (2019)
<https://doi.org/10.1103/PhysRevLett.123.116101>
-Highlighted as an [Editors' Suggestion](#), featured on the journal [Cover](#) and by news media [MRS News](#).
- Z. Dai**, Y. Hou, D. A. Sanchez, G. Wang, C. J. Brennan, L. Liu*, N. Lu*. Interface-Governed Deformation of Nanobubbles and Nanotents Formed by Two-Dimensional Materials. **Physical Review Letters** 121, 266101 (2018)
<https://doi.org/10.1103/PhysRevLett.121.266101>
-Highlighted as an [Editors' Suggestion](#), featured on the Journal [Cover](#).
- G. Wang†, **Z. Dai†**, Y. Wang, P. Tan, L. Liu*, Z. Xu*, Y. Wei, R. Huang, Z. Zhang*. Measuring Interlayer Shear Stress in Bilayer Graphene. **Physical Review Letters** 119, 036101 (2017)
<https://doi.org/10.1103/PhysRevLett.119.036101>
-Highlighted as an [Editors' Suggestion](#), also featured by news media including [APS Physics Focus](#), [Physicsworld](#), [PhysOrg](#).
- Z. Dai**, Y. Wang, L. Liu*, X. Liu, P. Tan, Z. Xu*, J. Kuang, Q. Liu, J. Lou, Z. Zhang*. Hierarchical Graphene Based Films with Dynamic Self-stiffening for Biomimetic Artificial Muscle. **Advanced Functional Materials** 26, 7003 (2016)
<https://doi.org/10.1002/adfm.201503917>

2024

- L. Yang*, S. Yue, Y. Tao, S. Qiao, H. Li, **Z. Dai**, B. Song, Y. Chen, J. Du*, D. Li, P. Gao. Suppressed thermal transport in silicon nanoribbons by inhomogeneous strain. **Nature** 629, 1021–1026 (2024)
<https://doi.org/10.1038/s41586-024-07390-4>
- Z. Dai***. Analytical solutions for circular elastic membranes under pressure. **Journal of Applied Mechanics** 91(8): 081002 (2024)
<https://doi.org/10.1115/1.4065338>
- B. Wang, J. Li, Z. Fang, Y. Jiang, S. Li, F. Zhan, **Z. Dai**, Q. Chen*, X. Wei*. Large and pressure-dependent c-axis piezoresistivity of highly oriented pyrolytic graphite near zero pressure. **Nano Letters** (2024)
<https://doi.org/10.1021/acs.nanolett.4c00687>
- W. Dong, **Z. Dai***, L. Liu*, Zhong Zhang. Toward clean 2D materials and devices: Recent progress in transfer and cleaning methods. **Advanced Materials** 2303014 (2024)

<https://doi.org/10.1002/adma.202303014>

5. Z. Zou, Z. Li, G. Zhou, W. Xu, Y. Zhou, W. Wu, Z. Chen, **Z. Dai**, X. Li*. Vision-based Tactile Sensing System for Surface Deformation Detection of elastomer using laser-light plane technology. **Advanced Intelligent Systems** 6, 2300535 (2023)
<https://doi.org/10.1002/aisy.202300535>

2023

6. C. Yu and **Z. Dai***. Characterizing the wetting behavior of 2D materials: A review. **Journal of Material Informatics** 3, 20 (2023)
<https://doi.org/10.20517/jmi.2023.27>
7. E. Chen and **Z. Dai***. Axisymmetric peeling of thin elastic films: A perturbation solution. **Journal of Applied Mechanics** 90(10), 101011 (2023)
<https://doi.org/10.1115/1.4062831>
8. S. Liu, J. He, Y. Rao, **Z. Dai**, H. Ye, J. C. Tanir, Y. Li, N. Lu. Conformability of flexible sheets on spherical surfaces. **Science Advances** 9, eadf2709 (2023)
<https://doi.org/10.1126/sciadv.adf2709>
9. Y. Rao, E. Kim, **Z. Dai**, J. He, Y. Li, N. Lu. Size-dependent shape characteristics of 2D crystal blisters. **Journal of the Mechanics and Physics of Solids** 175, 105286 (2023)
<https://doi.org/10.1016/j.jmps.2023.105286>
10. Z. Fang, **Z. Dai***, B. Wang, Z. Tian, C. Yu, Q. Chen, X. Wei*. Pull-to-peel of two-dimensional materials for the simultaneous determination of elasticity and adhesion. **Nano Letters** 23, 2, 742–749 (2023)
<https://doi.org/10.1021/acs.nanolett.2c03145>
-Featured on the journal [Cover](#)

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11. **Z. Dai**, Y. Rao, N. Lu*. Two-dimensional crystals on adhesive substrates subjected to uniform transverse pressure. **International Journal of Solids and Structures** 257, 111829 (2022)
<https://doi.org/10.1016/j.ijsolstr.2022.111829>
12. **Z. Dai** and D. Vella*. Droplets on Lubricant Infused Surfaces: The slow dynamics of skirt formation. **Physical Review Fluids** 7, 054003 (2022)
<https://doi.org/10.1103/PhysRevFluids.7.054003>
13. T. Yang, X. Jiang, Y. Huang, Q. Tian, L. Zhang, **Z. Dai**, H. Zhu*. Mechanical sensors based on two-dimensional materials: sensing mechanisms, structural designs and wearable applications. **iScience** 25, 103728 (2022)
<https://doi.org/10.1016/j.isci.2021.103728>
14. W. Wang, X. Ma, **Z. Dai**, S. Zhang, Y. Hou, G. Wang, Q. Li, L. Liu*, Y. Wei*, Z. Zhang*. Mechanical Behavior of Blisters Spontaneously Formed by Multilayer 2D Materials. **Advanced Materials Interfaces** 2101939 (2022)
<https://doi.org/10.1002/admi.202101939>

2021

15. Y. Hou†, **Z. Dai**†, S. Zhang†, S. Feng, G. Wang, L. Liu*, Z. Xu*, Q. Li*, Z. Zhang*. Elastocapillary cleaning of twisted bilayer graphene interfaces. **Nature Communications** 12, 5069 (2021)
<https://doi.org/10.1038/s41467-021-25302-2>
16. F. Shuang, **Z. Dai**, K. Aifantis*. Strengthening Metals by Graphene Inclusions: Transition from Interface Hardening to Precipitate Hardening. **ACS Applied Materials & Interfaces** 13, 26610 (2021)
<https://doi.org/10.1021/acsami.1c05129>
17. Y. Rao†, S. Qiao†, **Z. Dai**, N. Lu*. Elastic Wetting: Substrate-Supported Droplets Confined by Ultrathin Elastic Membranes. **Journal of the Mechanics and Physics of Solids** 151, 104399 (2021)
<https://doi.org/10.1016/j.jmps.2021.104399>
18. **Z. Dai***, N. Lu*. Poking and bulging of suspended thin sheets: slippage, instabilities, and metrology. **Journal of the Mechanics and Physics of Solids** 149, 104320 (2021)
<https://doi.org/10.1016/j.jmps.2021.104320>
19. D. Sanchez, **Z. Dai**, N. Lu*. 2D Material Bubbles: Fabrication, Characterization, and Applications. **Trends in Chemistry**

3, 204 (2021)

<https://doi.org/10.1016/j.trechm.2020.12.011>

20. G. Wang, Z. Zhang, Y. Wang, E. Gao, X. Jia, **Z. Dai**, C. Weng, L. Liu*, Y. Zhang, Z. Zhang*. Out-of-Plane Deformations Determined Mechanics of Vanadium Disulfide (VS₂) Sheets. **ACS Applied Materials & Interfaces** 13, 3040 (2021)
<https://pubs.acs.org/doi/10.1021/acsami.0c19835>
21. J. Shi, W. Zeng, **Z. Dai**, L. Wang, Q. Wang, S. Lin, Y. Xiong, S. Yang, S. Shang, W. Chen, L. Zhao, X. Ding, X. Tao*, Yang Chai*. Piezo-catalytic foam for highly efficient degradation of aqueous organics. **Small Science** 1, 2000011 (2021)
<https://doi.org/10.1002/smssc.202000011>

2020

22. **Z. Dai**, N. Lu, K. Liechti, R. Huang*. Mechanics at the Interfaces of 2D Materials: Challenges and Opportunities. **Current Opinions in Solid State & Materials Science** 24, 100837 (2020)
<https://doi.org/10.1016/j.cossms.2020.100837>
23. **Z. Dai**, D. Sanchez, C. J. Brennan, N. Lu*. Radial Buckle Delamination Around Two-Dimensional Material Tents. **Journal of the Mechanics and Physics of Solids** 137, 103843 (2020)
<https://doi.org/10.1016/j.jmps.2019.103843>
24. Y. Hou, X. Ren, J. Fan, G. Wang, **Z. Dai**, C. Jin, Y. Zhu, S. Zhang, L. Liu*, Z. Zhang*. Preparation of Twisted Bilayer Graphene via Wetting Transfer Method. **ACS Applied Materials & Interfaces** 12, 40958 (2020)
<https://doi.org/10.1021/acsami.0c12000>
25. C. Weng, T. Xing, H. Jin, G. Wang, **Z. Dai**, Z. Zeng, Y. Pei, L. Liu*, Z. Zhang*. Mechanically robust ANF/MXene composite films with tunable electromagnetic interference shielding performance. **Composites Part A: Applied Science and Manufacturing** 135, 105927 (2020)
<https://doi.org/10.1016/j.compositesa.2020.105927>
26. H. Jang, **Z. Dai**, K. Ha, S. K. Ameri, N. Lu*. Stretchability of Chemical Vapor Deposited Graphene Supported by Submicron-Thick Polymeric Substrates. **2D Materials** 7, 014003 (2020)
<https://doi.org/10.1088/2053-1583/ab4c0f>

2019

27. G. Wang†, **Z. Dai**†, J. Xiao†, S. Feng, C. Weng, L. Liu*, Z. Xu*, R. Huang*, Z. Zhang*. Bending of multilayer van der Waals materials. **Physical Review Letters** 123, 116101 (2019)
<https://doi.org/10.1103/PhysRevLett.123.116101>
-Highlighted as an **Editors' Suggestion**, featured on the journal **Cover** and by news media **MRS News**.
28. **Z. Dai**†, G. Wang†, Z. Zheng, Y. Wang, S. Zhang, X. Qi, P. Tan, L. Liu*, Z. Xu, Q. Li, Z. Cheng*, Z. Zhang*. Mechanical Responses of Boron-doped Monolayer Graphene. **Carbon** 147, 594 (2019)
<https://doi.org/10.1016/j.carbon.2019.03.014>
29. **Z. Dai**, L. Liu*, Z. Zhang*. Strain Engineering of Two-Dimensional Materials: Issues and Opportunities at the Interface. **Advanced Materials** 31, 1805417 (2019)
<https://doi.org/10.1002/adma.201805417>
-ESI highly cited paper; Selected as the journal **Frontispiece**.
30. C. Weng, G. Wang, **Z. Dai**, Y. Pei, L. Liu*, Z. Zhang*. Buckled AgNW/MXene Hybrid Hierarchical Sponges for High-Performance Electromagnetic Interference Shielding. **Nanoscale** 11, 22804 (2019)
<https://doi.org/10.1039/C9NR07988B>
31. J. Shi, S. Lv, L. Wang, **Z. Dai**, S. Yang, L. Zhao, H. Tian, M. Du, H. Li*, Y. Fang*. Crack Control in Biotemplated Gold Films for Wide-range, Highly Sensitive Strain Sensing. **Advanced Materials Interfaces** 6, 1901223 (2019)
<https://doi.org/10.1002/admi.201901223>
32. H. Jeong, L. Wang, T. Ha, R. Mitbender, X. Yang, **Z. Dai**, L. Shen, N. Sun, N. Lu*. Modular and Reconfigurable Wireless E-Tattoos for Personalized Sensing. **Advanced Materials Technologies** 1900117 (2019)
<https://doi.org/10.1002/admt.201900117>
33. X. Yang, Y. Huang, **Z. Dai**, J. Barber, P. Wang, N. Lu*. "Cut-and-Paste" Method for the Rapid Prototyping of Soft Electronics. **Science China Technological Sciences** 62, 199 (2019)

<https://doi.org/10.1007/s11431-018-9400-9>

34. C. Weng, **Z. Dai**, G. Wang, L. Liu*, Z. Zhang*. Elastomer-Free, Stretchable and Conformable Silver Nanowire Conductors Enabled by 3D Buckled Microstructures. **ACS Applied Materials & Interfaces** 11, 6541 (2019)
<https://doi.org/10.1021/acsami.8b19890>
35. L. Zhao, J. Zhao*, C. Zhang, Y. Liu, J. Shi, **Z. Dai**, Y. Guo, B. Li, H. Zhang, X. Feng, J. Zhang and Z. Zhang*. Hierarchical Surface Patterns Tuned by Shape Memory Polymers. **ACS Applied Materials & Interfaces** 11, 1563 (2019)
<https://doi.org/10.1021/acsami.8b15535>

2018

36. **Z. Dai**, Y. Hou, D. A. Sanchez, G. Wang, C. J. Brennan, L. Liu*, N. Lu*. Interface-Governed Deformation of Nanobubbles and Nanotents Formed by Two-Dimensional Materials. **Physical Review Letters** 121, 266101 (2018)
<https://doi.org/10.1103/PhysRevLett.121.266101>
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37. D. Sanchez†, **Z. Dai**†, P. Wang, A. Cantu-Chavez, C. J. Brennan, R. Huang*, N. Lu*. Mechanics of Liquid-Filled Nanobubbles Trapped by Two-Dimensional Crystals. **Proceedings of the National Academy of Sciences** 115, 7884 (2018)
<https://doi.org/10.1073/pnas.1801551115>
38. Y. Chen, **Z. Dai**, C. Weng, G. Wang, Y. Hou, X. Liu, X. Cong, P. Tan, L. Liu*, Z. Zhang*. Engineering the Interface in Mechanically Responsive Graphene-Based Films. **RSC Advances** 8, 36257 (2018)
<https://doi.org/10.1039/C8RA07974A>
39. J. Shi, L. Wang, **Z. Dai**, L. Zhao, M. Du, H. Li*, Y. Fang*. Multiscale Hierarchical Design of a Flexible Piezoresistive Pressure Sensor with High Sensitivity and Wide Linearity Range. **Small** 14, 1800819 (2018)
<https://doi.org/10.1002/sml.201800819>
40. Y. Wang, Y. Qiu, S. K. Ameri, H. Jang, **Z. Dai**, Y. Huang*, N. Lu*. Low-cost, μm -thick, tape-free electronic tattoo sensors with minimized motion and sweat artifacts. **npj Flexible Electronics** 2, 6 (2018)
<https://doi.org/10.1038/s41528-017-0019-4>
41. W. Li, L. Zhao, **Z. Dai**, H. Jin*, F. Duan, Z. Zeng, Z. Zhang*. A temperature-activated nanocomposite metamaterial absorber with a wide tunability. **Nano Research** 11, 3931 (2018)
<https://doi.org/10.1007/s12274-018-1973-4>
42. M. Choi†, J. Yang†, D. Kim†, **Z. Dai**, J. Kim, H. Seung, V. Kale, N. Lu, T. Hyeon*, D. Kim*. Extremely vivid transparent light-emitting diodes based on quantum dots. **Advanced Materials** 30, 1703279 (2018)
<https://doi.org/10.1002/adma.201703279>
 -Highlighted by [Advanced Science News](#).

2017

43. G. Wang†, **Z. Dai**†, Y. Wang, P. Tan, L. Liu*, Z. Xu*, Y. Wei, R. Huang, Z. Zhang*. Measuring Interlayer Shear Stress in Bilayer Graphene. **Physical Review Letters** 119, 036101 (2017)
<https://doi.org/10.1103/PhysRevLett.119.036101>
 -Highlighted as an [Editors' Suggestion](#), also featured by news media including [APS Physics Focus](#), [Physicsworld](#), [PhysOrg](#).
44. G. Wang, X. Li, Y. Wang, Z. Zheng, **Z. Dai**, X. Qi, L. Liu*, Z. Cheng, Z. Xu, P. Tan*, Z. Zhang*. Interlayer Coupling Behaviors of Boron Doped Multilayer Graphene. **Journal of Physical Chemistry** 121, 26034 (2017)
<https://doi.org/10.1021/acs.jpcc.7b05771>
45. J. Shi, J. Hu, **Z. Dai**, W. Zhao, P. Liu, L. Zhao, Y. Guo, T. Yang, L. Zou, K. Jiang, H. Li*, Y. Fang*. Graphene Welded Carbon Nanotube Crossbars for Biaxial Strain Sensors. **Carbon** 123, 786 (2017)
<https://doi.org/10.1016/j.carbon.2017.08.006>
46. Y. Hou, Y. Zhu, X. Liu, **Z. Dai**, L. Liu, H. Wu*, Z. Zhang*. Elastic-plastic properties of graphene engineered by oxygen functional groups. **Journal of Physics D Applied Physics** 50, 385305 (2017)
<https://doi.org/10.1088/1361-6463/aa7fd4>
47. G. Wang, E. Gao, **Z. Dai**, L. Liu*, Z. Xu*, Z. Zhang*. Degradation and recovery of graphene/polymer interfaces under cyclic mechanical loading. **Composites Science and Technology** 149, 220 (2017)

- <https://doi.org/10.1016/j.compscitech.2017.06.004>
48. Y. Li, K. Jiang, J. Feng, J. Liu, R. Huang, Z. Chen, J. Yang, **Z. Dai**, Y. Chen, N. Wang, W. Zhang, W. Zheng*, G. Yang*, X. Jiang*. Construction of Small-Diameter Vascular Graft by Shape-Memory and Self-Rolling Bacterial Cellulose Membrane. **Advanced Healthcare Materials** 6, 1601343 (2017)
<https://doi.org/10.1002/adhm.201601343>
49. Q. Wu, **Z. Dai**, Y. Su*, A. A. Volinsky*, L. Liu, Z. Zhang. Cyclic microbridge testing of graphene oxide membrane. **Carbon** 116, 479 (2017)
<https://doi.org/10.1016/j.carbon.2017.02.022>

Before 2016

50. **Z. Dai**, G. Wang, L. Liu*, Y. Hou, Y. Wei*, Z. Zhang*. Mechanical Behavior and Properties of Hydrogen bonded Graphene/Polymer Nano-Interfaces. **Composites Science and Technology** 136, 1 (2016)
<https://doi.org/10.1016/j.compscitech.2016.09.005>
51. **Z. Dai**, C. Weng, L. Liu*, X. Zhao, J. Kuang, Y. Hou, J. Shi, Y. Wei, J. Lou*, Z. Zhang*. Multifunctional Polymer-Based Graphene Foams with Buckled Structure and Negative Poisson's Ratio. **Scientific Reports** 6, 32989 (2016)
<https://doi.org/10.1038/srep32989>
52. **Z. Dai**, Y. Wang, L. Liu*, X. Liu, P. Tan, Z. Xu*, J. Kuang, Q. Liu, J. Lou, Z. Zhang*. Hierarchical Graphene Based Films with Dynamic Self-stiffening for Biomimetic Artificial Muscle. **Advanced Functional Materials** 26, 7003 (2016)
<https://doi.org/10.1002/adfm.201503917>
53. **Z. Dai**, L. Liu*, J. Kuang, Y. Wei, H. Zhu*, Z. Zhang*. Three-dimensional Sponges with Super Mechanical Stability: Harnessing True Elasticity of Individual Carbon Nanotubes in Macroscopic Architectures. **Scientific Reports** 6, 18930 (2016)
<https://doi.org/10.1038/srep18930>
54. G. Wang, **Z. Dai**, L. Liu*, H. Hu, Q. Dai*, Z. Zhang*. Tuning the Interfacial Mechanical Behaviors of Monolayer Graphene/PMMA Nanocomposites. **ACS Applied Materials & Interfaces** 8, 22554 (2016)
<https://doi.org/10.1021/acsami.6b03069>
55. W. Feng, W. Zhou, **Z. Dai**, A. Yasina, H. Yang*. Tough Polypseudorotaxane Supramolecular Hydrogel with Dual-responsive Shape Memory Property. **Journal of Materials Chemistry B** 4, 1924 (2016)
<https://doi.org/10.1039/C5TB02737C>
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56. J. Shi, X. Li*, H. Cheng, Z. Liu, L. Zhao, T. Yang, **Z. Dai**, Z. Cheng, L. Yang, E. Shi, M. Du, Z. Zhang, A. Cao, H. Zhu*, Y. Fang*. Graphene Reinforced Carbon Nanotube Networks for Wearable Strain Sensors. **Advanced Functional Materials** 26, 2078 (2016)
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60. J. Shang, Y. Chen, Y. Zhou, L. Liu*, G. Wang, X. Li, J. Kuang, Q. Liu, **Z. Dai**, H. Miao, L. Zhi*, Z. Zhang*. Effect of Folded and Crumpled Morphologies of Graphene Oxide Platelets on the Mechanical Performances of Polymer Nanocomposites. **Polymer** 68, 131 (2015)
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61. Q. Liu, L. Liu*, J. Kuang, **Z. Dai**, J. Han, Z. Zhang*. Nanostructured carbon materials based electrothermal air pump

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62. Z. Dai, Y. Gao, L. Liu*, P. Pötschke, J. Yang, Z. Zhang*. Creep-resistant behavior of MWCNT-polycarbonate melt spun nanocomposite fibers at elevated temperature. *Polymer* 54, 3723 (2013)

<https://doi.org/10.1016/j.polymer.2013.05.013>

Other writings:

63. Y. Li, G. Wang, Z. Dai, Y. Hou, H. Miao, L. Liu*, Z. Zhang*. Measurement of Young's Modulus of 2D Materials Through in situ Through-Hole Bubble Tests. *Journal of Experimental Mechanics* (in Chinese) DOI: 10.7520/1001-4888-19-037 (2019)

<https://doi.org/10.7520/1001-4888-19-037>

64. J. Xiao, G. Wang, Z. Dai, H. Miao, L. Liu*, Z. Zhang*. Nanoindentation of Multilayer Two-dimensional Materials: An Experimental Study. *Journal of Experimental Mechanics* (in Chinese) DOI: 10.7520/1001-4888-18-061 (2018)

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65. H. Jeong, T. Ha, I. Kuang, L. Shen, Z. Dai, N. Sun, N. Lu*. NFC-Enabled, Tattoo-Like Stretchable Biosensor Manufactured by "Cut-and-Paste" Method. *IEEE Engineering in Medicine and Biology Society* DOI: 10.1109/EMBC.2017.8037756 (2017)

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PATENTS

1. Z. Dai, L. Liu, Z. Zhang. Fabrication of Multi-Functional Sponge with Negative Poisson Ratio. Chinese Patent Application No. 201510455941.9.

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2. G. Wang, Z. Dai, L. Liu, Z. Zhang. A Method for Detecting the Interlayer Shear Force in 2D Materials. Chinese Patent Application No. 201710237043.5.

<https://patents.google.com/patent/CN106932379B/zh>

3. J. Xiao, G. Wang, Z. Dai, L. Liu, Z. Zhang. A Method for Detecting the Bending Rigidity of 2D Materials. Chinese Patent Application No. 201810677431.X.

<https://patents.google.com/patent/CN108871961A/zh>

PEER REVIEW

I have refereed articles for a number of journals/conferences¹, including:

2D Materials; ACS Applied Electronic Materials; ACS Applied Materials & Interfaces; ACS Applied Nano Materials; Acta Mechanica Solida Sinica; Advanced Materials Science and Technology; Applied Materials Today; Applied Mathematical Modelling; ASME's IMECE (×5); Carbon; Carbohydrate Polymers; Chemical Engineering Journal; Communications in Theoretical Physics; Composites Communications; Composites Science and Technology; Composites Part A (×3); Computational Materials Science; Engineering Science and Technology, an International Journal; Diamond & Related Materials; European Polymer Journal (×2); Extreme Mechanics Letters; International Journal of Mechanics and Materials in Design; International Journal of Mechanical Sciences (×16); International Journal of Smart and Nano Materials; International Journal of Solids and Structures (×2); Journal of Applied Mechanics; Journal of Applied Physics (×3); Journal of Industrial and Engineering Chemistry (×2); Journal of Intelligent Material Systems and Structures; Journal of Magnesium and Alloys; Journal of Physics Communications; Journal of Physics D: Applied Physics; Langmuir; Materials Letters (×6); Materials Research Bulletin (×3); Materials Research Express (×2); Measurement; Nano Express; Nano Letters (×2); Nanotechnology (×3); Nature Communications (×3); NPJ 2D Materials & Applications; Physica E (×2); Sensors; Sensors and Actuators: A (×4); Scientific Reports; Surfaces and Interfaces; Synthetic Metals (×2); Theoretical and Applied Mechanics Letters. 振动工程学报

I have been awarded Outstanding Reviewer by the journal IJSS and Trusted Reviewer by the publisher Institute of Physics.

¹ Try my [Publons](#) profile for more details.

Guest editor for Frontiers in Mechanical Engineering, Review editor for Frontiers in Carbon.

TEACHING

Mechanics of Solids (Spring 2023, Spring 2024)

Fracture Mechanics (Spring 2024)

Physics and Mechanics of Surfaces and Interfaces (Fall 2022, Fall 2023)

FUNDING

General Program of NSFC

10/2023 – 10/2027

Role: principal investigator (PI); Value: ¥510,000

Project title: Multiscale Adhesion Mechanics of Nanofilms

Description: Granted by the NSFC; Using AFM and multiscale theory to understand the adhesion of nanofilms.

Distinguished Overseas Young Talents

03/2022 – 03/2025

Role: principal investigator (PI); Value: ¥3,000,000

Project title: Micro and Nano Mechanics of Thin Films

Description: Granted by the NSFC; Exploiting theoretical models and nanoscale experiments to understand the static and dynamic deformation of thin films (particularly 2D materials).

Marie Skłodowska-Curie Individual Fellowship

09/21/2020 – 09/20/2022

Role: principal investigator (PI); Value: €224,933.76

Project title: Liquids Under Confinement In 2D-MATERials (LUCiD-Mater)

Description: Granted by the European Commission; Aiming to develop mathematical models for the dynamics of thin solid-liquid film interactions.

AWARDS

I am grateful for the generous financial support from many organizations, including:

2020	Marie Skłodowska-Curie Individual Fellowship, European Commission	€224,933
2019	University Graduate Continuing Fellowship, UT Austin	\$30,000
2019	Outstanding self-financed students abroad, China Scholarship Council	\$6,000
2019	Eric Baker Becker III Memorial Graduate Scholarship, UT Austin	\$2,500
2018	Warren A. and Alice L. Meyer Endowed Scholarship in Engineering, UT Austin	\$2,500
2018	Student Travel Award for attending IMECE, Haythornthwaite Foundation	\$1,000
2017	Global Research Fellowship, UT Austin	\$5,000
2017	Warren A. and Alice L. Meyer Endowed Scholarship in Engineering, UT Austin	\$3,500
2016	Yung-Huai Kuo Endowed Scholarship in Mechanics, CAS	¥3,000
2016	Presidential scholarship of the Chinese Academy of Sciences, CAS	¥5,000
2015	National scholarships for graduate students, Institute of Mechanics, CAS	¥10,000