

Baoxing Xu

Associate Professor (with tenure)

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EMPLOYMENT

Associate Professor (with tenure)	07/2020-Present
Assistant Professor	08/2014-07/2020

Department of Mechanical and Aerospace Engineering
University of Virginia

EDUCATION

Beckman Postdoctoral Fellow, Beckman Institute, UIUC	08/2012-08/2014
PhD in Mechanics and Materials, Columbia University	09/2008-10/2012
MS in Solid Mechanics, Northwestern Polytechnical University	09/2004-04/2007
BS in Engineering Mechanics, Northwestern Polytechnical University	08/2000-07/2004

RESEARCH INTERESTS

Our research interests are focused on multiscale-multiphysics mechanics driven extreme design and manufacturing of functional materials, structures and devices, in particular, soft-hard material integration, porous structures, solid-liquid functionalized materials, and bioinspired flexible devices and structures.

We also are working on nanomechanics at extreme conditions, including mechanics of liquids in nanoconfinements, nanofluidics in response to environments, and thermal transport of mechanically deformed nanomaterials.

SELECTED AWARDS & HONORS

Sia Nemat-Nasser Early Career Award, ASME	2020
Young Investigator Program (YIP) Award, Office of Naval Research	2020
Beckman Postdoctoral Fellowship, University of Illinois at Urbana-Champaign	2012

NSF Travel Grant Award for ASME IMECE Micro/Nano Poster Forum	2011
NSF Travel Grant Award for CMMI Research and Innovation Conference	2010
Boeing Graduate Fellowship at Columbia University, Boeing Company	2008
Best Thesis for Master Degree , Northwestern Polytechnical University	2008
Best Student Graduate Award , Shaanxi Province	2007
Outstanding Scholarship , China Baosteel Education Foundation	2006
National Scholarship (1 st Prize), Ministry of Education of China	2002
Full Score Scholarship in Advanced Mathematics both (I) and (II) , Northwestern Polytechnical University	2001, 2002

SELECTED PUBLICATIONS at UVA (* group student, ^ corresponding author)

Full list of papers: <https://xugroup.weebly.com/pubications.html>

- [1]. Yue Zhang*, Mengtian Yin*, Yongmin Baek, Kyusang Lee, Giovanni Zangari, Liheng Cai, **Baoxing Xu**[^]. Capillary Transfer of Soft Films. *Proceedings of the National Academy of Sciences (PNAS)*. 117(2020) 5210-5216
- [2]. Haozhe Zhang*, Weizhu Yang, **Baoxing Xu**[^]. Rotation Mechanics of Optical Scatters in Stretchable Metasurfaces. *International Journal of Solids and Structures*. 191-192(2020)566-576
- [3]. Hyungjun Kim, Heung Soo Lee, Yale Jeon, Woohyun Park, Yue Zhang*, Bongjoong Kim, Hanmin Jang, **Baoxing Xu**, Yoon Yeo, Dong Rip Kim, Chi Hwan Lee. Bioresorbable, Miniaturized Porous Silicon Needles on Flexible Water-Soluble Backing for Unobtrusive, Sustained Delivery of Chemotherapy. *ACS Nano*. 14 (2020) 7227-7236.
- [4]. Qingchang Liu*, Jiaying Huang and **Baoxing Xu**[^]. Evaporation-driven Crumpling and Assembling of Two-Dimensional (2D) Materials: A Rotational Spring – Mechanical Slider Model. *Journal of the Mechanics and Physics of Solids*. 133(2019)103722 (34 pages)
- [5]. Mengtian Yin*, Li Xiao, Sung-Yun Kwon, Yi Zhang, Poonam R Sharma, Li Jin, Xudong Li and **Baoxing Xu**[^]. 3D Printed Microheater Sensor-Integrated, Drug-Encapsulated Microneedle Patch System for Pain Management. *Advanced Healthcare Materials* (2019) 1901170.
- [6]. Weizhu Yang*, Zongzhan Gao, Zhufeng Yue, Xiaodong Li, **Baoxing Xu**[^]. Hard-Particle

Rotation Enables Soft-Hard Integrated Auxetic Mechanical Metamaterials. *Proceedings of the Royal Society A*. 475(2019)0234 (20 pages)

- [7]. Bongjoong Kim[†], Jiyeon Jeon[†], Yue Zhang^{†*}, Dae Seung Wie, Jehwan Hwang, Sang Jun Lee, Dennis E. Walker Jr., Don C. Abeysinghe, Augustine Urbas, **Baoxing Xu**[^], Zahyun Ku, Chi Hwan Lee. Integration of three dimensional (3D) plasmonic nanoarrays with arbitrary substrate materials and structures. ([†]Equal contribution). *Nano Letters*. 19(2019)5796-5805
- [8]. Yue Zhang*, Bongjoong Kim, Yuan Gao*, Dae Seung Wie, Chi Hwan Lee, **Baoxing Xu**[^]. Mechanics of Transfer Printing of Thin Films in a Liquid Environment. *International Journal of Solids and Structures (IJSS)*. 180-181(2019)30-44
- [9]. Yuan Gao*, Yue Zhang*, **Baoxing Xu**[^]. Confined Water-Assistant Thermal Response of Graphene-Oxide Heterostructure and Its Enabled Mechanical Sensors for Load Sensing and Mode Differentiation. *ACS Applied Materials & Interfaces*. 11(2019)19596-19604.
- [10]. Xu Wang, Qingchang Liu*, Siyao Wu, **Baoxing Xu**, and Hangxun Xu. Multilayer Polypyrrole Nanosheets with Self-Organized Surface Structures for Flexible and Efficient Solar-Thermal Energy Conversion. *Advanced Materials*. 31(2019)1807716.
- [11]. Liu Wang[#], Yuan Gao^{**}, Fanqi Dai, Deying Kong, Huachun Wang, Pengcheng Sun, Zhao Shi, Xing Sheng, **Baoxing Xu**[^] and Lan Yin. Geometrical and Chemical Dependent Hydrolysis Mechanisms of Silicon Nanomembranes for Biodegradable Electronics. ([#]Equal contribution). *ACS Applied Materials & Interfaces*. 11(2019)18013-18023
- [12]. Weizhu Yang*, Qingchang Liu*, Zongzhan Gao, Zhufeng Yue, **Baoxing Xu**[^]. Theoretical Search for Heterogeneously Architected 2D Structures. *Proceedings of the National Academy of Sciences (PNAS)*. 115(2018) 7245-7254.
- [13]. Yuan Gao*, **Baoxing Xu**[^]. van der Waals Graphene Kirigami Heterostructure for Strain-Controlled Thermal Transparency. *ACS Nano*. 12(2018)11254-11262.
- [14]. Dae Seung Wie[#], Yue Zhang^{**}, Min Ku Kim, Bongjoong Kim, Sangwook Park, Young-Joon Kim, Pedro P. Irazoquid, Xiaolin Zheng, **Baoxing Xu**[^], Chi Hwan Lee. Wafer-recyclable, environment-friendly transfer printing for large-scale thin film nanoelectronics. *Proceedings of the National Academy of Sciences (PNAS)*. 115(2018) 7236-7244. ([#]Equal contribution)
- [15]. Yue Zhang*, Mingzhe Li, Yuan Gao, **Baoxing Xu**[^], Weiyi Lu. Compressing Liquid Nanofoam System: Liquid Infiltration or Nanopore Deformation? *Nanoscale*. 10(2018)18444-18450.
- [16]. Weizhu Yang*, Jia Yang, Yize Dong*, Shimin Mao, Zongzhan Gao, Zhufeng Yue, Shen J. Dillon, Hangxun Xu, **Baoxing Xu**[^]. Probing Buckling and Post-buckling Deformation of

Hollow Amorphous Carbon Nanospheres: In-situ Experiment and Theoretical Analysis. *Carbon*. 137(2018)411-418.

- [17]. Yuan Gao*, **Baoxing Xu**[^]. On the Generalized Thermal Conductance Characterizations of Mixed One-Dimensional–Two-Dimensional van der Waals Heterostructures and Their Implication for Pressure Sensors. *ACS Applied Materials & Interfaces*. 10 (2018)14221-14229.
- [18]. Tao Wang, Ying Zhang, Qingchang Liu*, Wen Cheng, Xinran Wang, Lijia Pan, **Baoxing Xu**, Hangxun Xu. A Self-Healable, Highly Stretchable, and Solution Processable Conductive Polymer Composite for Ultrasensitive Strain and Pressure Sensing. *Advanced Functional Materials*. 28(2018)1705551.
- [19]. Yuan Gao*, **Baoxing Xu**[^]. Controllable Interface Junction, In-Plane Heterostructures Capable of Mechanically Mediating On-Demand Asymmetry of Thermal Transports. *ACS Applied Materials & Interfaces*. 9 (2017)34506-34517.
- [20]. Yue Zhang*, Qingchang Liu*, **Baoxing Xu**[^]. Liquid-Assisted, Etching-Free, Mechanical Peeling of 2D Materials. *Extreme Mechanics Letters*. 16(2017)33-40.
- [21]. Weizhu Yang*, Qingchang Liu*, Zhufeng Yue, Xiaodong Li, **Baoxing Xu**[^]. Rotation of Hard Particles in a Soft Matrix. *Journal of the Mechanics and Physics of Solids*. 101(2017)285-310
- [22]. Yuan Gao*, Qingchang Liu*, **Baoxing Xu**[^]. Lattice Mismatch Dominant Yet Mechanically Tunable Thermal Conductivity in Bilayer Heterostructures. *ACS Nano*. 10(2016)5431–5439.
- [23]. Qingchang Liu*, **Baoxing Xu**[^]. A Unified Mechanics Model for Wettability Gradient-Driven Motion of Water Droplet on Solid Surfaces. *Extreme Mechanics Letters*. 9(2016)304-309.
- [24]. Weizhu Yang*, Zhufeng Yue, **Baoxing Xu**[^]. A Hybrid Elastomeric Foam-core/Solid-shell Spherical Structure for Enhanced Energy Absorption Performance. *International Journal of Solids and Structures*. 92-93(2016)17-28.
- [25]. Qingchang Liu*, Yuan Gao*, **Baoxing Xu**[^]. Liquid Evaporation-Driven Folding of Graphene Sheets. *Applied Physics Letters*. 108(2016)141906.
- [26]. Baoxing **Xu**[^], John A Rogers. Mechanics-Driven Approaches to Manufacturing—A Perspective. *Extreme Mechanics Letters*. 7(2016)44-48.

SELECTED ACTIVITIES

- [1]. Chair of Multifunctional Materials Technical Committee, ASME Materials Division, 11/2018-
- [2]. Guest Editor for Special Issue “Mechanics in Extreme Manufacturing” in the journal of

- Extreme Mechanics Letters (Elsevier) 2015
- [3]. Reviewer: NSF, DOE, Golden Research Conference proposals 2016-
- [4]. Symposium organizer: MRS spring, ASME, WCCM, SES conferences 2015-
- [5]. Journal reviewer: Nature, Nature Communications, Science Advances, Advanced Materials, Advanced Functional Materials, National Science Review, Journal of the Mechanics and Physics of Solids, Nano Letters, ACS Nano, Journal of Applied Mechanics, Extreme Mechanics Letters, Chem, Applied Physics Letters, Applied Mechanics Reviews, Nanoscale, Soft Matters, etc. 2015-