Xiang NI

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Summary of Research Interests

My current research supervised by Prof. Jianyu Li focuses on tuning adhesion properties of hydrogels combining strategies of mechanics and chemistry. To understand, predict and control mechanical behaviors of hydrogels, my research investigated the fracture behavior of tissue adhesive hydrogels. Novel techniques arising from my research include programming adhesion performance of hydrogels by surface topology.

I am now keen to collaborate with material scientists at XXX University and aim to develop advanced materials including but not limited to engineering materials, electrical materials and semi-conductor materials. I would also like to contribute to computational materials science which shows great power in materials research. I am currently exploring the possibility of finding a doctoral position, given the current interest in novel materials.

Education

M.Eng.Thesis Mechanical Engineering, McGill University, Canada (2018-2021)
M.Eng.Thesis is balanced between research and courses; significantly improved research abilities, teamwork, and knowledge of material properties.

B.Eng Civil Engineering, Southeast University, China (2014-2018)
Undertook broad range of courses including mechanics of materials, solid mechanics, elasticity mechanics, construction material and physics

Publications

Xiang Ni, Guangyu Bao, Luc Mongeau, Jianyu Li, Proceedings of the National Academy of Sciences, Under Revision [arXiv]

Xiang Ni, Zhen Yang, Jianyu Li. ACS Macro Letters, Under Revision [arXiv]

Xiang Ni, Chao Chen, and Jianyu Li. "Interfacial fatigue fracture of tissue adhesive hydrogels." Extreme Mechanics Letters 34 (2020): 100601. [link]

Please visit ResearchGate for my recent publications.

Research Projects

M.Eng.Thesis. Biomaterial Adhesion, McGill University, Canada (Dec. 2019 – Dec. 2020) Supervised by Prof. Jianyu Li. Project: programming hydrogel adhesion property by controlling surface topology; created a strategy to modulate tissue adhesion spatially. Methods: hydrogel synthesis, SEM, tensile test, AFM, confocal microscope. Analysis: python and Matlab

M.Eng.Thesis. Mechanics of Soft Material, McGill University, Canada (Sept. 2018 – Dec. 2019) Supervised by Prof. Jianyu Li. Project: 1) exploring fatigue fracture of tissue adhesive hydrogels; obtained the fatigue threshold and compared with theoretical calculation. 2) investigating scaling behavior of fracture properties of tough adhesive hydrogels; found a scaling relationship between toughness, adhesion energy and modulus of tough hydrogel. Methods: hydrogel synthesis, tensile test, rheological measurement. Analysis: Matlab, Prism

B.Eng. Mechanics of Metallic Glass, Southeast University, China (Sept. 2017 – Sept. 2018) Supervised by Prof. Jixing Meng. Project: designed and implemented a study on vibrational behavior of metallic glass; built a finite element model and compared with experimental results. Methods: cantilever vibration, Patran, signal processing. Analysis: Matlab

Exchange Student. Pedestrian Dynamics, Monash University, Australia (Feb. - May. 2018) Supervised by Prof. Hai Vu. Constructed a social force model for pedestrian dynamics from video recorded data; reviewed literature on the topic.

Contribution to Conference

Society of Engineering Science Virtual Technical Meeting (Sept. 2020). Selected to attend this conference. Contributed to discussion about frontiers in mechanics of materials. Gained overview of biomechanics and biomaterials; demonstrated communication skills and presentation skills.

Courses and Additional Skills

Core Courses: quantum chemistry, advanced mechanics of materials, mechanics of composite materials, mechanics of biological materials

Online Courses: xMinor in Materials for Electronic, Optical, and Magnetic Devices; From Atoms to Materials: Predictive Theory and Simulations; Semiconductor Devices. (Self-directed learning undertaken via Coursera and Edx.)

Additional skills: Python, C++, Matlab, LAMMPS, Prism, LaTex, Office

Language: Chinese (native), English (fluent)

References available on request