

## Gexu LIU

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### EDUCATION BACKGROUND

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| 2022/07 -present | <b>University of Pennsylvania (UPenn)</b><br><b>Master of Material Science and Engineering</b>                                                                                                     | Pennsylvania, United States |
| 09/2017-08/2021  | <b>University of Waterloo (UWaterloo)</b><br><b>Bachelor of Science in Materials and Nanosciences, Honours</b> <ul style="list-style-type: none"><li>GPA: 91.73/100 (Excellent Standing)</li></ul> | Waterloo, Canada            |
| 09/2017-08/2021  | <b>Beijing Jiaotong University (BJTU)</b><br><b>Bachelor of Engineering in Nanomaterials and Technology</b> <ul style="list-style-type: none"><li>GPA: 91.8/100</li></ul>                          | Beijing, China              |

### PUBLICATION

Gexu LIU (the 4<sup>th</sup> author). A Method to Prepare a Polydopamine-functionalized Graphene Hydrogel Adsorbent and its Application. CN201811329720.7. 01/2019

### RESEARCH EXPERIENCES

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| 10/2022-06/2023 | <b>A rapidly expandable seat belt with high load bearing and energy absorption</b> <ul style="list-style-type: none"><li>Fabricate an origami-inspired, pressure or impact-driven, architected seat belt with a large expansion area (up to 2 times), evenly distributed stress, and high load bearing and energy absorption capabilities at the chest area.</li><li>Finite element simulation of origami-inspired seat belt under impact force (Dynamic analysis).</li><li>Conduct impact test for the origami-inspired seat belt</li></ul> <b>Mechanical stability and strength for the geometry of liquid crystal elastomer</b> <ul style="list-style-type: none"><li>Synthesis the liquid crystal elastomer utilizing one-pot and oligomer method</li><li>Conduct POM (Polarized optical microscope) test for liquid crystal elastomer fiber.</li><li>Mechanical test for the liquid crystal elastomer.</li></ul> <b>Electrochemical Performance Testing of Commercial LMO (LiMn2O4) Cathode</b> |
| 09/2022-12/2022 | <ul style="list-style-type: none"><li>Conducted relevant tests on LMO using an electrochemical workstation, including cyclic voltammetry (CV) tests at different scanning rates and constant current charge-discharge tests at different C rates.</li><li>Analyzed experimental data using Origin and MATLAB, plotted related electrochemical curves, and examined battery energy changes under rapid charge-discharge conditions.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 02/2023-06/2023 | <b>Evaluation of Carbon-Based Electronic Devices</b> <ul style="list-style-type: none"><li>Studied the electronic structures and properties of carbon nanotubes (CNTs), assessing the structure, performance, and applications of three types of CNT devices: field-effect transistors, supercapacitors, and lithium-ion battery anodes.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 09/2022-12/2022 | <b>Atomic-scale Simulation Research</b> <ul style="list-style-type: none"><li>Applied atomic-level modeling methods in the context of materials science: use Python to simulate and interpret the results of molecular statics, molecular dynamics, and Monte Carlo</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

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|                 | <p>methods studying structures and properties of particle assemblies through specific atomic interactions.</p> <ul style="list-style-type: none"> <li>• Gained understanding of material behaviors at nano, micro, and macro scales through atomic-level simulation research.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 05/2020-09/2020 | <p><b>Research on Amyloid Protein Interaction with Biomembranes and its Effect on Model Membrane Permeability</b></p> <ul style="list-style-type: none"> <li>• Utilized novel Black Lipid Membrane (BLM) technology and LPSR characterization techniques to study the interaction mechanisms between amyloid proteins and neuronal cell membranes.</li> <li>• Monitored changes in BLM and LSPR signals to obtain dynamic information on the interaction between A<math>\beta</math> protein and biomembranes.</li> <li>• Further examined the factors affecting this interaction by doping with different concentrations of melatonin</li> </ul>                                                                                                                                                                                                                         |
| 03/2018-03/2019 | <p><b>Dopamine Functionalized Graphene Hydrogel Adsorbent and its Application</b></p> <ul style="list-style-type: none"> <li>• Prepared dopamine-functionalized graphene hydrogel using thermal reduction method under normal pressure to enhance its absorption and degradation capacity for Rhodamine B.</li> <li>• Measured concentration changes of designed organic solutions under hydrogel adsorbent using UV-Vis spectroscopy.</li> <li>• Further enhanced the absorption and degradation capacity of hydrogel by attaching TiO<sub>2</sub> and Ag and tested the influence of concentration and type of reducing agent on the adsorption performance of graphene hydrogel.</li> <li>• Participated in the application for a national invention patent: A preparation method for polydopamine-graphene hydrogel adsorbent and its application process.</li> </ul> |

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#### EXTRACURRICULAR EXPERIENCES

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| 08/2019-12/2019 | Volunteer, attended cross-cultural activities in the Conversation Partner Program Waterloo, Canada |
| 02/2019         | Volunteer, introduced BJTU to local high school students to assist with recruitment Linyi, China   |
| 03/2018-12/2018 | Volunteer, worked as a tutor teaching a primary school student English and Math Beijing, China     |
| 09/2018-06/2019 | Coach & Leader, BJTU Sports Meeting Broadcast Gymnastics Team Beijing, China                       |
| 10/2017-06/2018 | Participant, BJTU Aerobics Contest Beijing, China                                                  |

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#### AWARDS & HONORS

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| 05/2021 | Dean's Honors List (unconditionally promoted, for the top 10/100 in a class) by UWaterloo |
| 10/2019 | First-tier Scholarship (for the top 3/100) by BJTU                                        |
| 10/2018 | First-tier Scholarship (for the top 3/100) by BJTU                                        |
| 09/2018 | Honor Roll Student by BJTU                                                                |

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#### ADDITIONAL INFORMATION

- Technical: UV-Vis spectroscopy, Solidworks, 3D Printer, Origin Pro, Clampfit, Office, LabVIEW, Python, Matlab, Photoshop, Adobe Illustrator, etc.