


# Woojin Bae

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## Research Interests

### Investigation of Nanomaterials through Advanced Analytical Techniques

- **Nanomaterials:** Perovskite, Zeolite, Metal Oxide, Nanoparticle.
- **Advanced Analytical Techniques:** Transmission Electron Microscopy, Self-Driving Labs.

## Education

Bachelor's degree in Chemical and Biological Engineering   <b>Seoul National University</b>	<b>2020 - Present</b>
Exchange student in Chemical and Biomolecular Engineering   <b>North Carolina State University</b>	<b>Spring 2025</b>
Major in Chemistry   <b>Daejeon Science High School for the Gifted</b>	<b>2017 - 2020</b>

## Research Experience

<b>Self-Driving Fluidic Lab, NCSU</b> (Advisor: Prof. Milad Abolhasani)	<b>Jan. 2025 - May. 2025</b>
<ul style="list-style-type: none"><li>• Synthesized Mn-doped perovskite quantum dots (PQDs) leveraging a self-driving approach (ongoing)</li></ul>	<i>Raleigh, NC</i>
<b>Multi-dimensional Materials Chemistry Lab, SNU</b> (Advisor: Prof. Jungwon Park)	<b>Mar. 2024 - Present</b>
<ul style="list-style-type: none"><li>• Synthesized Ag cluster-based AIGS (silver indium gallium sulfide)-core.</li><li>• SEI Structures Dependent Li-Morphology Characterized by cryo-TEM; developed a protocol for quantitative analysis of SEI.</li><li>• <b>Team Leader</b> of "Undergraduate Independent Study 1" regarding LMBs SEI Cryo-TEM analyzing.</li></ul>	<i>Seoul, Korea</i>
<b>Center for Cell-Encapsulation Research, KAIST</b> (Advisor: Prof. Insung Choi)	<b>Mar. 2018 - May. 2019</b>
<ul style="list-style-type: none"><li>• Created a porous titanium oxide shell to facilitate the in-vitro culturing of astrocytes.</li><li>• Confirmed the function of encapsulated astrocytes by analyzing the length of co-cultured neurons.</li></ul>	<i>Daejeon, Korea</i>

## Conference Presentations

†: equally contributed, \*: corresponding author

SEI Structures Dependent Li-Morphology Characterized by Cryo-TEM. **Bae, W.**; Jeong, S.; Ji, S.; Jeon, Y.; Park, J.  
*Katalyst 2025: Building Bridges, Shaping Leaders: From Ambition to Action*, Raleigh, NC, US (Feb 22, 2025). Poster Presentation.

SEI Structures Dependent Li-Morphology Characterized by Cryo-TEM. **Bae, W.**†; Jeong, S.†; Ji, S.†; Jeon, Y.; Park, J.\*  
*The 2024 Annual Fall Conference of Korean Society of Microscopy*, Gyeongju, Korea (Nov 25, 2024). Poster Presentation.

Rethinking Life Choices Beyond the Child Penalty. **Bae, W.**†; Miu Akutsu.†; Park, J.†; Xing Qing.†  
*Tokyo Forum 2024: Shape the Future, Design for Tomorrow*, Tokyo, Japan (Nov 22-23, 2024). Oral Presentation.

Regulation of astrocyte growth using porous titanium oxide shells. **Bae, W.**; Lee, K.; Lee, C.; Kim, T.; Choi, I.\*  
*Korean Chemical Society Future Chemist Research Presentation*, Daegu, Korea (Oct 19, 2018). Poster Presentation.

Wettability Change of Self-Assembled Monolayers (SAMs) of Thiol on Gold. **Bae, W.**; Lee, K.; Lee, C.\*  
*The 51st Joint School Science Exhibition*, Hong Kong, Hong Kong (Aug 22-27, 2018). Poster Presentation

## Honors & Awards

<b>Excellence Undergraduate Research Award</b>   2024 Student-Directed Education Program Symposium	<b>Jan. 2025</b>
<ul style="list-style-type: none"><li>• SEI Structures Dependent Li-Morphology Characterized by Cryo-TEM.</li></ul>	
<b>Korea-U.S. Student Exchange Program in the field of high-tech industry</b>   Ministry of Trade, Industry and Energy	<b>Nov. 2024</b>
<ul style="list-style-type: none"><li>• Awarded <b>\$9000 scholarship</b> as a STEM-specialized exchange student.</li></ul>	
<b>Excellence Award</b>   Undergraduate Research Program for Advanced Equipment	<b>Jan. 2024</b>
<ul style="list-style-type: none"><li>• Consideration on the relationship between microscopic structure and macroscopic shape according to the synthesis conditions of Hollow ZSM-5.</li></ul>	
<b>Team Section Winner</b>   We Change SNU Contest	<b>Jul. 2022</b>
<ul style="list-style-type: none"><li>• A spatial-restricted messenger allowing messages to be accessed only at SNUfestival locations designated by the sender.</li></ul>	
<b>The Education and Research Foundation Scholarship</b>   College of Engineering, SNU	<b>Spring 2021</b>
<b>Merit-based Scholarship</b>   Department of Chemical and Biological Engineering, SNU	<b>Fall 2020</b>
<b>2020 Future Chemistry Talent Award</b>   The Korean Union of Chemical Science and Technology Societies	<b>Feb. 2020</b>
<ul style="list-style-type: none"><li>• Awarded as one of the <b>top 6 science high school students</b> in Korea</li></ul>	
<b>Excellence Poster Award</b>   2019 Gifted School R&E Joint Presentation Conference	<b>Jan. 2019</b>
<ul style="list-style-type: none"><li>• Regulation of astrocyte growth using porous titanium oxide shells.</li></ul>	

<b>Honorable Mention</b>   2017 Science Gifted and Talented Creative Research Conference	<b>Jan. 2018</b>
<ul style="list-style-type: none"> <li>• Correlation between Z-potential and contact angle of AuNPs solution.</li> </ul>	

## Leadership

<b>Tokyo Forum Youth Session</b>   The University of Tokyo & Chey Institute for Advanced Studies, Japan	<b>Aug. 2024 - Nov. 2024</b>
<ul style="list-style-type: none"> <li>• <b>Representative of Korea</b>, participated in the wrap-up session hosted by the President of the University of Tokyo.</li> </ul>	

<b>HKUST Entrepreneurship Bootcamp 2024</b>   Hong Kong University of Science and Technology, Hong Kong	<b>Jul. 2024</b>
<ul style="list-style-type: none"> <li>• Participated in a mock-up competition as a <b>team leader</b> and won the <b>third prize</b> for a worldwide healthcare platform.</li> </ul>	

<b>Marketing team &amp; manager</b>   SNUfestival, Student council-affiliated organization, SNU	<b>Jun. 2021 - May. 2022</b>
<ul style="list-style-type: none"> <li>• Promoted the festival through the <b>online website</b> and video during the COVID-19 pandemic.</li> <li>• <b>Secured sponsorship</b> from a shared scooter company during the first in-person festival after the COVID-19 pandemic.</li> </ul>	

<b>Vice president</b>   Chemical and Biological Engineering Interim Leadership, SNU	<b>Dec. 2020 - Mar. 2021</b>
<ul style="list-style-type: none"> <li>• <b>Conducted freshman orientation</b>, via Zoom during the COVID-19 pandemic.</li> </ul>	

## Membership & Activities

<b>Undergraduate Membership</b>   Korean-American Scientists and Engineers Association	<b>Jan. 2025 – Present</b>
<ul style="list-style-type: none"> <li>• A non-profit organization that fosters collaboration and networking among Korean-American scientists and engineers.</li> </ul>	

<b>Young Engineers Honor Society</b>   National Academy of Engineering of Korea	<b>Nov. 2024 - Present</b>
<ul style="list-style-type: none"> <li>• Korean engineering honor society under National Academy of Engineering of Korea.</li> </ul>	

<b>SNU-UMN Culture Exchange Program</b>   The University of Minnesota, Minneapolis, MN	<b>Mar. 2024</b>
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2023 Winter Vacation Data Science Bootcamp: <b>Computing</b>   Graduate School of Data Science, SNU	<b>Feb. 2024</b>
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<b>Republic of Korea Air Force</b>   Daegu, Korea	<b>Aug. 2022 - May. 2024</b>
<ul style="list-style-type: none"> <li>• 110<sup>th</sup> Squadron, operating the F-15K Slam Eagle. Selected as an <b>exemplary soldier</b>.</li> </ul>	

<b>SNU in EU program</b>   Brussels School of Governance, Belgium	<b>Jul. 2022</b>
<ul style="list-style-type: none"> <li>• Understanding European Unions, M2170.004600, delivered a presentation titled "The European External Action Service".</li> </ul>	

<b>Kansas Academy of Mathematics and Science Research Program</b>   Fort Hays State University, Hays, KS	<b>Jul. 2018</b>
<ul style="list-style-type: none"> <li>• Synthesized ZnSe quantum dots and applying them on Dye-sensitized solar cell. (Advisor: Prof. Arvin J. Cruz)</li> </ul>	

## Teaching & Mentoring Experiences

<b>Korean Language Peer Mentor</b>   Language Education Institute, SNU	<b>Fall 2024</b>
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<b>Learning Assistant</b>   Faculty of Liberal Education, SNU	<b>Fall 2024</b>
<ul style="list-style-type: none"> <li>• Basic Computing: First Adventures in Computing, L0444.000400.</li> </ul>	

<b>Lecturer, TEM Seminar</b>   Multi-dimensional Materials Chemistry Lab, SNU	<b>May. 2024</b>
<ul style="list-style-type: none"> <li>• Amplitude and Phase Contrast.</li> </ul>	

<b>Student Mentor, SNU Mentoring</b>   Seoul National University Social Responsibility	<b>Apr. 2023 - Present</b>
<ul style="list-style-type: none"> <li>• Provided career guidance to the middle school student from underserved communities, selected as a <b>superb mentor</b>.</li> </ul>	

## Skills & Languages

- **Instruments:** TEM, SEM, UV-Vis, OM, PL
- **Languages:** Korean (Native), English (C1, TOEFL 95)
- **Programming Languages:** Python, C, Html, CSS
- **Software:** Adobe Premiere Pro, Adobe illustrator, Fusion 360, Gatan DigitalMicrograph