



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 Seoul National University	2020 - Present
Exchange student in Chemical and Biomolecular Engineering North Carolina State University	Spring 2025
Major in Chemistry Daejeon Science High School for the Gifted	2017 - 2020

Research Experience

Summer Research Initiative, ASU (Advisor: Prof. Sandhya Susarla) • Selected as a research intern in the SURI 2025 program at Arizona State University. • Collaborated on cryo-TEM in beam-sensitive materials synthesized at NCSU, with 4D-STEM and phase-retrieval techniques.	May. 2025 – Jul. 2025 <i>Tempe, AZ</i>
Self-Driving Fluidic Lab, NCSU (Advisor: Prof. Milad Abolhasani) • Synthesized Mn-doped perovskite quantum dots leveraging a self-driving approach. • Gave a poster presentation on Spring Undergraduate Research & Creativity Symposium.	Jan. 2025 - May. 2025 <i>Raleigh, NC</i>
Multi-dimensional Materials Chemistry Lab, SNU (Advisor: Prof. Jungwon Park) • Synthesized Ag cluster-based AIGS (silver indium gallium sulfide)-core. • SEI Structures Dependent Li-Morphology Characterized by cryo-TEM; developed a protocol for quantitative analysis of SEI. • Team Leader of “Undergraduate Independent Study 1” regarding LMBs SEI Cryo-TEM analyzing.	Mar. 2024 - Present <i>Seoul, Korea</i>
Center for Cell-Encapsulation Research, KAIST (Advisor: Prof. Insung Choi) • Created a porous titanium oxide shell to facilitate the in-vitro culturing of astrocytes. • Confirmed the function of encapsulated astrocytes by analyzing the length of co-cultured neurons.	Mar. 2018 - May. 2019 <i>Daejeon, Korea</i>

Conference Presentations

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

Excellence Undergraduate Research Award 2024 Student-Directed Education Program Symposium • SEI Structures Dependent Li-Morphology Characterized by Cryo-TEM.	Jan. 2025
Korea-U.S. Student Exchange Program in the field of high-tech industry Ministry of Trade, Industry and Energy • Awarded \$9000 scholarship as a STEM-specialized exchange student.	Nov. 2024
Excellence Award Undergraduate Research Program for Advanced Equipment • Consideration on the relationship between microscopic structure and macroscopic shape according to the synthesis conditions of Hollow ZSM-5.	Jan. 2024
Team Section Winner We Change SNU Contest • A spatial-restricted messenger allowing messages to be accessed only at SNUfestival locations designated by the sender.	Jul. 2022
The Education and Research Foundation Scholarship College of Engineering, SNU	Spring 2021
Merit-based Scholarship Department of Chemical and Biological Engineering, SNU	Fall 2020
2020 Future Chemistry Talent Award The Korean Union of Chemical Science and Technology Societies • Awarded as one of the top 6 science high school students in Korea	Feb. 2020

Excellence Poster Award | 2019 Gifted School R&E Joint Presentation Conference **Jan. 2019**
• Regulation of astrocyte growth using porous titanium oxide shells.

Honorable Mention | 2017 Science Gifted and Talented Creative Research Conference **Jan. 2018**
• Correlation between Z-potential and contact angle of AuNPs solution.

Leadership

Tokyo Forum Youth Session | The University of Tokyo & Chey Institute for Advanced Studies, Japan **Aug. 2024 - Nov. 2024**
• **Representative of Korea**, participated in the wrap-up session hosted by the President of the University of Tokyo.

HKUST Entrepreneurship Bootcamp 2024 | Hong Kong University of Science and Technology, Hong Kong **Jul. 2024**
• Participated in a mock-up competition as a **team leader** and won the **third prize** for a worldwide healthcare platform.

Marketing team & manager | SNUfestival, Student council-affiliated organization, SNU **Jun. 2021 - May. 2022**
• Promoted the festival through the **online website** and video during the COVID-19 pandemic.
• **Secured sponsorship** from a shared scooter company during the first in-person festival after the COVID-19 pandemic.

Vice president | Chemical and Biological Engineering Interim Leadership, SNU **Dec. 2020 - Mar. 2021**
• **Conducted freshman orientation**, via Zoom during the COVID-19 pandemic.

Membership & Activities

Undergraduate Membership | Korean-American Scientists and Engineers Association **Jan. 2025 – Present**
• A non-profit organization that fosters collaboration and networking among Korean American scientists and engineers.
• Gave a presentation on ‘SEI Structures Dependent Li-Morphology Characterized by Cryo-TEM’ at **Katalyst 2025**, a nationwide Korean American undergraduate conference.

Young Engineers Honor Society | National Academy of Engineering of Korea **Nov. 2024 - Present**
• Korean engineering honor society under National Academy of Engineering of Korea.

SNU-UMN Culture Exchange Program | The University of Minnesota, Minneapolis, MN **Mar. 2024**

2023 Winter Vacation Data Science Bootcamp: **Computing** (Certified) | Graduate School of Data Science, SNU **Feb. 2024**

Republic of Korea Air Force | Daegu, Korea **Aug. 2022 - May. 2024**
• 110th Squadron, operating the F-15K Slam Eagle. Selected as an **exemplary soldier**.

SNU in EU program | Brussels School of Governance, Belgium **Jul. 2022**
• Understanding European Unions, M2170.004600, delivered a presentation titled "The European External Action Service".

Kansas Academy of Mathematics and Science Research Program | Fort Hays State University, Hays, KS **Jul. 2018**
• Synthesized ZnSe quantum dots and applying them on Dye-sensitized solar cell. (Advisor: Prof. Arvin J. Cruz)

Teaching & Mentoring Experiences

Korean Language Peer Mentor | Language Education Institute, SNU **Fall 2024**

Learning Assistant | Faculty of Liberal Education, SNU **Fall 2024**
• Basic Computing: First Adventures in Computing, L0444.000400.

Lecturer, TEM Seminar | Multi-dimensional Materials Chemistry Lab, SNU **May. 2024**
• Amplitude and Phase Contrast.

Student Mentor, SNU Mentoring | Seoul National University Social Responsibility **Apr. 2023 - Present**
• Provided career guidance to the middle school student from underserved communities, selected as a **superb mentor**.

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