

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, Laboratory Automation.

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

Self-Driving Fluidic Lab, NCSU

Jan. 2025 - May. 2025

Undergraduate Researcher (Advisor: Prof. Milad Abolhasani)

Raleigh, NC

- Synthesized Mn-doped perovskite quantum dots (PQDs) leveraging a self-driving approach (ongoing)

Multi-dimensional Materials Chemistry Lab, SNU

Mar. 2024 - Present

Undergraduate Researcher (Advisor: Prof. Jungwon Park)

Seoul, Korea

- 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.

Center for Cell-Encapsulation Research, KAIST

Mar. 2018 - May. 2019

R&E Researcher (Advisor: Prof. Insung Choi)

Daejeon, Korea

- 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.

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.*

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

Jan. 2025

- SEI Structures Dependent Li-Morphology Characterized by Cryo-TEM.

Korea-U.S. Student Exchange Program in the field of high-tech industry | Ministry of Trade, Industry and Energy

Nov. 2024

- Awarded **\$9000 scholarship** as a STEM-specialized exchange student.

Excellence Award | Undergraduate Research Program for Advanced Equipment

Jan. 2024

- Consideration on the relationship between microscopic structure and macroscopic shape according to the synthesis conditions of Hollow ZSM-5.

Team Section Winner | We Change SNU Contest

Jul. 2022

- A spatial-restricted messenger allowing messages to be accessed only at SNUfestival locations designated by the sender.

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

Feb. 2020

- Awarded as one of the **top 6 science high school students** in Korea

Excellence Poster Award | 2019 Gifted School R&E Joint Presentation Conference

Jan. 2019

- Regulation of astrocyte growth using porous titanium oxide shells.

Encouragement Prize 2017 Science Gifted and Talented Creative Research Conference	Jan. 2018
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • Conducted freshman orientation, via Zoom during the COVID-19 pandemic. 	

Membership & Activities

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

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

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

SNU in EU program Brussels School of Governance, Belgium	Jul. 2022
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • 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
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Learning Assistant Faculty of Liberal Education, SNU	Fall 2024
<ul style="list-style-type: none"> • Basic Computing: First Adventures in Computing, L0444.000400. 	

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

Student Mentor, SNU Mentoring Seoul National University Social Responsibility	Apr. 2023 - Present
<ul style="list-style-type: none"> • 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