


# 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**  
• 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 Korean students**, 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.

**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** | Graduate School of Data Science, SNU **Feb. 2024**

**Republic of Korea Air Force** | Daegu, Korea **Aug. 2022 - May. 2024**  
• 110<sup>th</sup> 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