

# Woojin Bae

usmebbb@snu.ac.kr  
(+1) 984-379-9887  
woojinb.vercel.app

## RESEARCH INTERESTS

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### Design and Fabrication of Nanomaterials through Advanced Techniques

- **Nanomaterials:** Perovskite, Zeolite, Metal Oxide, Nanoparticle.
- **Advanced Techniques:** Transmission Electron Microscopy, Autonomous Laboratories.

## EDUCATION

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### Seoul National University (SNU), Seoul, South Korea Expected Aug. 2026

B.S. Chemical and Biological Engineering (CBE), *Cum Laude (expected)*

- GPA: 3.72/4.3 (overall), 3.67/4.0 (converted)

### North Carolina State University (NCSU), Raleigh, NC May 2025

Exchange student in Chemical and Biomolecular Engineering

- GPA: 4.0/4.0, AICHE at NC State

### Daejeon Science High School for the Gifted Feb. 2020

## RESEARCH EXPERIENCE

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### Multi-dimensional Materials Chemistry Lab, SNU Mar. 2024 – Present

Undergraduate Researcher - (30h/week) (Advisor: Prof. Jungwon Park) Seoul, Korea

- **Team Leader;** Developed a DBSCAN-based protocol for quantitative analysis of SEI; SEI Structures Dependent Li-Morphology Characterized by cryo-TEM.
- Initiated and led a **collaborative project** across SNU and NCSU to optimize AI-driven synthesis of Mn-doped CsPb(Cl/Br)<sub>3</sub> QDs, combining autonomous laboratories and TEM analysis.

### Summer Undergraduate Initiative (SURI), ASU May 2025 – Jul. 2025

Undergraduate Researcher - (30h/week) (Advisor: Prof. Sandhya SuSarla) Tempe, AZ

- Selected for the **SURI fellowship** at Arizona State University (\$5000 stipend).
- Synthesized perovskite nanocrystals with controlled morphologies to investigate phonon–polariton coupling with hexagonal boron nitride (hBN).
- Presented a poster at Summer Research Initiative Final Research Showcase.

### Self-Driving Fluidic Lab, NCSU Jan. 2025 – May 2025

Undergraduate Researcher - (10h/week) (Advisor: Prof. Milad Abolhasani) Raleigh, NC

- Achieved 60% PLQY improvement of Mn-doped CsPb(Cl/Br)<sub>3</sub> perovskite through genetic algorithm-based synthesis optimization in autonomous lab.
- Presented a poster at Spring Undergraduate Research & Creativity Symposium.

## PUBLICATIONS / PRESENTATIONS

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Jinge Xu.; **Bae, W.**; Milad Abolhasani. \*, Autonomous Mn-doped Perovskite Nanocrystals synthesis by a Self-Driving lab. *Manuscript in preparation.*

**Bae, W.**; Jung, S.; Ji, S.; Jeon, Y.; Park, J. \*, SEI Structures Dependent Li-Morphology Characterized by Cryo-TEM. *The 2024 Annual Fall Conference of Korean Society of Microscopy*, Gyeongju, Korea, Nov 25-26, 2024.

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

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

## HONORS & AWARDS

**Research Grant** | Undergraduate Research Support Program, SNU College, SNU **May 2025**

- Selected for a **\$2000 Research Grant** for a collaborative project across SNU and NCSU.

**Excellence Research Award** | 2024 Student-Directed Education Program Symposium **Jan. 2025**

- Theme: SEI structures dependent Li-morphology characterized by Cryo-TEM.

**STEM Exchange Scholarship** | Ministry of Trade, Industry and Energy, Korea **Nov. 2024**

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

**Excellence Award** | Undergraduate Research Program for Advanced Equipment **Jan. 2024**

- Awarded for excellence in undergraduate research on hollow ZSM-5 synthesis.

**2020 Future Chemical Talent Award** | KUCST, The Korean Chemical Society **Feb. 2020**

- Selected as one of the **top 6 science high school students nationwide**.

## LEADERSHIP & MEMBERSHIPS

**Undergraduate Member** | Korean-American Scientists and Engineers Association **Jan. 2025**

- A non-profit organization that fosters collaboration among Korean-American scientists and engineers. Delivered a research presentation at nationwide Korean-American undergraduate conference, **Katalyst 2025**.

**Tokyo Forum Youth Session** | The University of Tokyo, Japan **Fall 2024**

- **Representative of Korea**, in a session on Aging Society and Low Birth Rate.

**Young Engineers Honor Society** | National Academy of Engineering of Korea **2024 – Present**

- Korean engineering honor society under National Academy of Engineering of Korea.

**Republic of Korea Air Force** | 11th Fighter Wing, Daegu, Korea **Aug. 2022 – May 2024**

**Marketing team manager** | SNUfestival, Student Council, SNU **Jun. 2021 – May 2022**

- Promoted the festival through the **online website** and secured **\$2200 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 **Winter 2020**

- **Developed an online program** for incoming freshman during the COVID-19 pandemic.

## TEACHING & MENTORING EXPERIENCES

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

**Peer Tutor** | Basic Computing: First Adventures in Computing, SNU **Fall 2024**

**Lecturer, TEM Seminar** | Multi-dimensional Materials Chemistry Lab, SNU **May 2024**

**Student Mentor, SNU Mentoring** | SNU Social Responsibility **Apr. 2023 – Present**

- Provided career guidance to underserved students, recognized as an **outstanding mentor**.

## TECHNICAL SKILLS & LANGUAGES

- **Instruments:** TEM, SEM, UV-Vis, OM, PL
- **Programming Language:** Python (Certified ML Specialization, Coursera), MATLAB, C
- **Software:** Gatan DigitalMicrograph, cITEM, Git, Adobe, Fusion 360
- **Languages:** Korean (Native), English (C1, TOEFL 95)