SuJi Kim

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EDUCATION

The Catholic University of Korea Bucheon, Republic of Korea
Bachelor of Engineering, Biomedical Chemical Engineering *03/2021 - 02/2025*

Marian University Indianapolis, IN
Exchange Student *01/2024 - 05/2024*

RESEARCH EXPERIENCES

Biomaterials for Regenerative Medicine Lab, The Catholic University of Korea Bucheon, Republic of Korea
Undergraduate Researcher *07/2024 - 01/2025*

- Fabricated PFPE-PEGDA microfluidic chips with CO_2 laser-engraved channels, resulting in stable oil droplet generation with <2% CV
- Developed PTFE microfluidic devices for LNP synthesis, optimizing channel dimensions to achieve 9-fold higher flow rates without leakage
- Addressed particle aggregation from CO_2 laser-induced roughness using mechanical polishing and oxygen plasma, improving channel smoothness and particle uniformity

3D Printing-Based High-Efficiency Micromixer Design and Fabrication Bucheon, Republic of Korea
Capstone Research Project 09/2024 - 12/2024

- Designed and fabricated a DLP-printed micromixer with helical channels, achieving a high mixing efficiency of 0.967 through geometric optimization
- Quantitatively analyzed fluorescence images to determine pixel-based mixing efficiency and investigate flow behavior in microchannels
- Demonstrated uniform LNP synthesis (~110 nm, PDI < 0.2) at high flow rates, highlighting its potential for scalable drug-delivery applications

High-Efficiency Spheroid Fabrication Platform Using Hydrophobic Surfaces Bucheon, Republic of Korea
Department Academic Symposium (Awarded Research Presentations) *07/2024 - 12/2024*

- Led a team to develop a 3D spheroid fabrication platform with hydrophobic surfaces using soft lithography and electrospun PU nanofibers, validating pattern transfer and surface morphology through SEM imaging
- Developed and optimized a two-step PDA and STA coating protocol to tailor surface chemistry and topography, confirmed by FTIR and AFM, resulting in enhanced hydrophobicity (contact angle >105°)
- Conducted cell culture experiments demonstrating that the modified surfaces promoted cell adhesion and spheroid formation, effectively mimicking the in-vivo microenvironment
- Developed a DLP-printed microfluidic device with an optimized hydrophobic surface, validating its fluidic performance for biomedical applications

Antimicrobial Evaluation of Ginger for Potential Topical Skin Applications Indianapolis, IN
Academic Research Project *01/2024 - 05/2024*

- Conducted a team-based microbiology project evaluating the antimicrobial effects of ginger essential oil, Ciprofloxacin, and sterile water against *E. coli* and *S. aureus*
- Analyzed quantitative data and presented findings in a poster session, highlighting the selective antimicrobial activity of ginger oil compared to standard antibiotics

EXTRACURRICULAR ACTIVITIES

Bio Big Data (Genomics) Analyst Training Program Seoul, Republic of Korea
Professional Bioinformatics Education (Korea Biotechnology Industry Organization) *06/2025 - 08/2025*

- Completed a 10-week intensive NGS data analysis program using Linux, Python, and R, covering WGS, Exome, RNA-Seq, Targeted, and Metagenome sequencing, with data visualization and shell scripting, trained by industry experts from Illumina, Macrogen, AWS, and other leading biotech companies
- Analyzed gut microbiome sequencing data of hypertensive and CKD patients using QIIME2 and DADA2,

generating ASVs, assigning taxonomy from phylum to species, and evaluating α-diversity and community structure via PCoA (Bray–Curtis)
- Developed and executed an RNA-Seq pipeline for Arabidopsis thaliana root samples under Pseudomonas aeruginosa infection, performing QC (fastp, Q30 >96%), alignment (TopHat2, >85% mapping), expression quantification and differential analysis (Cufflinks/Cuffdiff), and functional enrichment (g:Profiler, clusterProfiler
- Developed a Random Forest model (scikit-learn) for the Breast Cancer dataset in a Bio Data Coding Competition, performing exploratory data analysis, visualization, and hyperparameter tuning (GridSearchCV), achieving an AUC of 0.984 and interpreting results in a biomedical context

SW Educational Volunteer Group Seoul, Republic of Korea
Computing & Coding club (CodeWave) *10/2024 - 12/2024*
- Organized and taught weekly computing workshops at the Gangnam District Daechi Library, introducing 10 elementary students to foundational concepts in programming and computing systems
- Guided students through creative project development, supporting them in building interactive Scratch works that enhanced their algorithmic thinking and design skills
- Conducted hands-on Python activities, including simple games like rock scissor paper and grammar exercises, to build confidence and spark interest in text-based coding

63rd NUSB National Undergraduate Biology Symposium Seoul, Republic of Korea
Academic Symposium at Seoul National University *06/2024 - 09/2024*
- Led weekly literature review sessions at the National Biology Symposium's Protein Engineering Division, coordinating team analyses on recent advances in directed evolution and computational protein design
- Delivered a main presentation on orthogonal synthetic timer circuits using ECF σ factors, demonstrating their scalability as regulatory elements for time-delayed gene expression in *E. coli* and *B. subtilis*

Chemistry Club Indianapolis, IN
Chemistry Club at Marian University 01/2024 - 05/2024
- Led sustainability-focused science activities, including an eco-friendly dry ice experiment and a recycled-pendant workshop that repurposed over 30 pieces of Styrofoam, engaging about 15 students in hands-on learning about upcycling and environmental responsibility

WORK EXPERIENCE

Eduplex Seoul, Republic of Korea
Instructor *01/2021 - 06/2024*
- Mentored 30+ high school students in Calculus, Biology, and Chemistry, improving average grades by 7%, and developed personalized learning strategies through performance data analysis

AWARDS & HONORS

Ethical Leaders Rearing Program(ELP) Award *02/2025*
- Selective award at graduation, honoring sustained effort and holistic development throughout the university experience, with well-rounded contributions in leadership, academics, and community engagement

BMCE LAB with ER(Education & Research) Project Award *12/2024*
- Presented research findings as the lead presenter at a departmental academic symposium on the development of a high-efficiency spheroid platform using hydrophobic surfaces, awarded 3rd place

International Exchange Office club(CUBIG) Activity Scholarship *03/2022 - 12/2023*
- Designed and implemented a one-on-one buddy program and various integration activities to support international students' cultural adjustment, successfully engaging over 150 participants