

DOHUI KIM

Korean Minjok Leadership Academy (KMLA) · Hoengseong, Republic of Korea
dohuikim777@gmail.com · +82 10-3856-4101 · dohuikim.com

EDUCATION

Korean Minjok Leadership Academy (KMLA), Hoengseong, Republic of Korea

Current secondary-school student

RESEARCH EXPERIENCE

Standardized Colorimetric Scale for Ammonia-Responsive Agarose–Anthocyanin Hydrogel Patches as a Universal Multi-Food Spoilage Detector — Lead Researcher | 2024–Present

- Developed a low-cost agarose–anthocyanin hydrogel patch that detects volatile ammonia through a stepwise color change.
- Demonstrated non-contact headspace sensing below the human odor threshold (~5 ppm) within ~22 minutes; validated performance on spoiled beef and anchovy at room and refrigerated temperatures.
- Reduced estimated manufacturing cost to approximately \$0.20 per patch, compared with \$320+ for conventional ammonia-detection equipment.
- Built a standardized UV–Vis (A600/A520) colorimetric scale for instrument-free interpretation and screened indicator systems, hydrogel matrices, anthocyanin concentrations, and preparation order.
- Extended pilot testing to hydrogen sulfide sensing with copper(I) oxide gels; identified stability, visual-interpretation, absorbance-linearity, and food-range limitations.

Integrative Research Projects — Student Researcher | 2025

- Designed 16 chitosan formulations with citrus, coffee-ground, banana, and effective-microorganism extracts; found dose-dependent antimicrobial activity, strongest with citrus extract.
- Reported the absence of broad plant-growth promotion and redirected the project toward antibacterial films and hydrogel-based delivery.
- Tested electrical stimulation as an inducer of plant immune gene PR1 using RNA extraction, RT-PCR, primer selection, and gel electrophoresis; observed the clearest increase at 9 V.
- Adapted the original animal-tissue concept to plants and developed a semi-quantitative electrophoresis-band readout when RT-qPCR and liquid-nitrogen facilities were unavailable.

PUBLICATIONS & PRESENTATIONS

- Kim, D. First-author research article on food-spoilage sensor development and validation. *Journal of High School Sciences*.
- Kim, D. Standardized Colorimetric Scale for Ammonia-Responsive Agarose–Anthocyanin Hydrogel Patches as a Universal Multi-Food Spoilage Detector. Poster presented at Regeneron International Science and Engineering Fair, Materials Science, 2026.

SELECTED HONORS & AWARDS

- Regeneron International Science and Engineering Fair — Finalist, Materials Science (2026)
- Korea Science and Engineering Fair — Gold Award (2025)
- 13th Integrative Project Fair — Silver Award, electrical-stimulation plant-immunity research (2025)
- American Mathematics Competitions 12 — Top 25% (2025)
- International Chemistry Tournament — Team 1st Place; Individual Gold Medal, 2nd overall; Korean representative (2024)
- Korea National History Day — Third Prize (2024)
- John Locke Essay Competition — Very High Commendation, Psychology; top 1% (2023)

PUBLIC HEALTH LEADERSHIP & SERVICE

HOSA (Health Occupations Students of America) — Founder and President | 2024–Present

- Founded and expanded the chapter from 5 to 21 members; organized five operating teams and instituted regular meetings, training, feedback surveys, and facility-specific planning.
- Led monthly service at four elder- and disability-care facilities in Gangwon Province, coordinating activities, staffing, supplies, transportation, and feedback.
- Produced age-specific public-health materials on seasonal and preventive-health topics and distributed them to 20 schools across Gangwon Province.
- Built a public online archive of the materials and distribution record; authored and distributed a 15–25-page chapter startup and operations guide through a cross-school network.
- Planned a fundraising café that generated KRW 704,000 in revenue and KRW 307,820 in net profit; introduced QR-code pre-order and pre-payment when inventory ran short.

- Organized a 2026 blood-donation event and founded a network connecting at least three school public-health chapters for resource sharing and quarterly collaboration.
- Presented “Connection for Seniors,” a privacy-conscious student–senior matching platform addressing depression and social isolation, at the Harvard VISION Global Health Society conference.

OB-GYN Medical Volunteer — Kampong Thom Hospital, Cambodia | 2025

- Supported patient care and clinical operations for approximately 1,000 patients during a one-week placement (~8 hours/day) in an under-resourced obstetrics and gynecology clinic.
- Observed healthcare-access constraints in a clinical setting and connected them to ongoing public-health service work.

LEADERSHIP & CIVIC ENGAGEMENT

Student Legislative Council — President, elected by approximately 450 students | 2025–2026

- Led a 20-member assembly meeting twice monthly and reviewed eight policy proposals spanning election rules, device use, exercise procedures, study-space access, and cooling standards.
- Livestreamed assemblies, published verbatim minutes by the next morning, and advanced only motions earning a two-thirds vote.
- Synthesized class discussions and survey results for school leaders; negotiated with the dean of students, principal, and vice principal on policy and administrative constraints.

Mock Trial Club — Attorney | 2024–Present

- Served primarily as Opening and Closing Attorney, with direct- and cross-examination experience; represented Korea at Empire Mock Trial in Chicago.
- Earned Best Attorney and Team 5th Place at the Korea Mock Trial Association Summer Tournament (2026), Outstanding Attorney and Team 2nd Place at the Winter Tournament (2025), and Team 3rd Place at the Summer Tournament (2024).
- Helped select 7–9 members from 50–60 annual applicants and trained new members in procedure, courtroom etiquette, evidence rules, objections, performance, and case preparation.
- Authored and iteratively tested a club operations and training guide covering recruitment, roles, practice structure, tournament preparation, sample scripts, and feedback forms.

International Chemistry Tournament / TOMCTO — President and Student Organizer | 2024–2026

- Earned Team 1st Place and Individual 2nd Place (Gold Medal) at the 7th International Chemistry Tournament in Bucharest, Romania.
- Served as vice president and president of TOMCTO; trained new members, led practice debates, and organized team-building.
- Contributed 58 hours as a student organizer and moderator for the 8th International Chemistry Tournament at KMLA.

Department of School Environment — Member, Deputy Head, and Head | 2024–2025

- Worked with custodial staff and administrators to replace opaque cloth waste bins with steel frames and transparent liners after identifying approximately three hours of daily re-sorting.
- Published a school-wide campaign using waste-site photographs and a practical sorting guide; reached approximately 90 students.
- Surveyed dormitory needs, coordinated bin purchasing and distribution, and co-created recycling education for incoming students.

School Public Relations — Presentation Team Member, selected 6:1 | 2024–Present

- Lead campus tours and orientation presentations on KMLA programs, traditions, and student self-governance.
- Co-wrote and appeared in a school promotional video; produced leaflet content and led two-hour tours for groups of 15–20 incoming students.

Class President — Grades 10–11, two semesters | 2024–2025

- Coordinated communication, class meetings, sports preparation, events, fees, attendance, and required submissions.
- Helped the class place third among 20 classes in inter-class sports.

Model United Nations and Debate

- Yonsei Model United Nations — Honorable Mention (2024)
- School Debate Competition — Team 2nd Place (2024)

ARTS & ATHLETICS

Violin — KMLA Orchestra, First Violin | Since age 6

- Perform in charity concerts, recitals, solo performances, and annual orchestra concerts; performed at Carnegie Hall.
- Boston International Classical Music Competition — 2nd Prize; Vivaldi International Music Competition — 2nd Prize.
- New York International Music Competition — Senate Citation.

Fencing (Sabre) — Raffine Fencing Club | 2024–Present

- Train twice weekly with individual coaching.
- Gangwon Provincial Sports Festival, Women's Sabre Team — 1st Place (2024, 2025, 2026).
- President's Cup Fencing — 2nd Place individual (9th competition) and 3rd Place individual (8th competition).