

Yeji Kim

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Water Resources Engineer specializing in hydraulic modeling and real-time monitoring of water systems. Experienced in integrating SCADA and sensor data to develop data-driven tools for anomaly detection, system diagnostics, and operational decision-making to enhance system performance and reliability.

EDUCATION

University of Texas at Austin <i>Ph.D. candidate in Civil Engineering (Environmental and Water Resources Engineering)</i>	Texas, United States 2021 – 2026 (Expected)
Gwangju Institute of Science and Technology (GIST) <i>Master of Science in Earth Sciences and Environmental Engineering</i>	Gwangju, South Korea 2019
Ewha Womans University <i>Bachelor of Science in Environmental Science & Engineering</i>	Seoul, South Korea 2016

RESEARCH & WORK EXPERIENCE

University of Texas at Austin <i>Graduate Research Assistant, Future water systems Lab (Professor Matthew Bartos)</i>	Texas, United States Jul. 2021– Present
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Real-Time Sensor Quality Control & Data Assimilation (Waller Creek Watershed, Austin, Texas)

- Developed a Python-based hydrologic–hydraulic modeling framework using PipeDream solver for unsteady flow simulation and data assimilation in an urban watershed
- Designed an online quality control (QC) algorithm using Extended Kalman Filter (EKF) to detect and correct sensor faults in streaming data, achieving ROC AUC > 0.99
- Developed and deployed a wireless sensing network (4 ultrasonic sensor nodes) to collect continuous water level data for real-time model integration
- Enabled real-time anomaly detection and improved water level prediction, supporting flood alert and monitoring systems

Hydraulic Modeling & Probabilistic Leak Detection (Water Distribution System, Unalakleet, Alaska)

- Developed a Python-based hydraulic modeling and data assimilation system using EPANET for network-wide state estimation and monitoring in a remote water distribution system (4 loops, ~740 population)
- Designed a probabilistic framework for leak detection, localization, and system diagnostics under uncertainty (pipe roughness, demand variability, hydraulic losses)
- Integrated SCADA API data, wireless pressure sensors, and adaptive sampling within an AWS-based data pipeline, enabling continuous monitoring, anomaly detection, and data-driven operational decision-making (e.g., pump scheduling and valve control)

University of Seoul <i>Research Scientist, Water resources management Lab</i>	Seoul, South Korea Jan. 2021– Jun. 2021
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- Evaluation of a machine-learning model for chlorophyll a retrieval using Sentinel-2 from inland and coastal waters

Polyscape <i>Data scientist at Urban platform service company</i>	Daejeon, South Korea Jun. 2019–Dec. 2020
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- Developed IoT system to collect real-time data such as air quality (PM2.5, PM10), and population with Raspberry Pi
- Organized and managed database (MySQL) server and web server (Django web frame) for analysis and visualization of real-time data with REST API

Gwangju Institute of Science and Technology (GIST) <i>Graduate Research Assistant</i>	Gwangju, South Korea Feb 2017 – Mar 2019
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- Investigated membrane fouling and performance in RO and FO-based water treatment systems, focusing on water quality and operational stability relevant to high-purity water applications.
- Designed and fabricated membrane spacer geometries using 3D CAD and 3D printing, and conducted performance evaluations to assess fouling behavior and system efficiency

PAPER & CONFERENCE

Journal Articles (Peer-Reviewed)

- **Kim, Y.**, Huang, Y., Bartos, M. (2026). From Field Data Collection to Smart Operations: A Digital Twin Framework for Rural Alaska Water Distribution Systems [ES&T Water, Accepted]
- **Kim, Y.**, Oh, J., & Bartos, M. (2025). Stormwater digital twin with online quality control detects urban flood hazards under uncertainty. *Sustainable Cities and Society*, 105982. [Published]
- Yang, E., Park, S., **Kim, Y.**, Yanar, N., & Choi, H. (2023). Fabrication and Investigation of Acid Functionalized CNT Blended Nanocomposite Hollow Fiber Membrane for High Filtration and Antifouling Performance in Ultrafiltration Process. *Membranes*, 13(1), 70.
- Kim, Y. W., Kim, T., Shin, J., Lee, D. S., Park, Y. S., **Kim, Y.**, & Cha, Y. (2022). Validity evaluation of a machine-learning model for chlorophyll a retrieval using Sentinel-2 from inland and coastal waters. *Ecological Indicators*, 137, 108737. [Published]
- **Kim, Y.**, Yang, E., Park, H., & Choi, H. (2020). Anti-biofouling effect of a thin film nanocomposite membrane with a functionalized-carbon-nanotube-blended polymeric support for the pressure-retarded osmosis process. *RSC Advances*, 10(10), 5697-5703. [Published]
- Yanar, N., Son, M., Yang, E., **Kim, Y.**, Park, H., Nam, S. E., & Choi, H. (2018). Investigation of the performance behavior of a forward osmosis membrane system using various feed spacer materials fabricated by 3D printing technique. *Chemosphere*, 202, 708-715.
- Munagapati, V. S., Yarramuthi, V., **Kim, Y.**, Lee, K. M., & Kim, D. S. (2018). Removal of anionic dyes (Reactive Black 5 and Congo Red) from aqueous solutions using Banana Peel Powder as an adsorbent. *Ecotoxicology and environmental safety*, 148, 601-607.

Manuscripts Under Review

- **Kim, Y.** & Bartos, M. (2025). Probabilistic parameter-estimation framework for discovery of pre-existing leaks in water distribution systems [Water Research, Preparation]

AWARDS & HONORS

Friends of Alec Graduate Student Fellowship

UT Austin, TX | 2025

Kolodzey Travel Grant

UT Austin, TX | 2024

TEACHING EXPERIENCE

University of Texas at Austin

2025

Teaching Assistant - Elements of Hydraulic Engineering (CE 356)

- Instructed laboratory sessions for an undergraduate hydraulic engineering course, training students in HEC-RAS, HEC-HMS, and EPANET for practical hydrologic and hydraulic modeling applications

GIST Global Science Camp

Jul. 2018

Instructor (National University of Laos and the University of Cancun)

- Demonstrated a water treatment experiment using the Mekong River and an experiment related to air pollution and solar batteries

TECHNICAL SKILLS

Certifications: FE Civil (EIT Application in Progress)

Hydrologic & Hydraulic Modeling: HEC-HMS, HEC-RAS, EPANET, WNTR, SWMM, rainfall-runoff analysis, model calibration, scenario analysis, Pump scheduling

GIS & Design: ArcGIS, AutoCAD

Field Monitoring & Analysis: Data assimilation (Kalman filtering), Bayesian inference, Monte Carlo simulation, machine learning (CNN, RNN, SVM, KNN) for QA/QC, leak detection, and water quality estimation

IoT & Backend: Raspberry Pi, REST API, Flask, Django, MySQL, Linux, InfluxDB, AWS EC2, Microcontroller (Particle Boron), GIT, Labjack data acquisition system