Yerin Choe

(gygyerin@snu.ac.kr / gygyerin.github.io)

Research Interest

- **Industrial ecology**: life-cycle assessment (LCA) of products and emerging technologies, macroscopic-scale material flow analysis (MFA), energy model, decarbonization, water-energy nexus, framework development incorporating artificial intelligence (AI)
- **Water treatment**: physico-chemical water treatment, resource recovery, water reuse, photochemical degradation, organic micropollutants, byproduct formation, sustainable process design, LCA of environmental technologies, water-energy-environment nexus

Education

Seoul National University (SNU) **Mar. 2022 – Feb. 2024**
Master of Science in Civil and Environmental Engineering *Seoul, South Korea*
Thesis: Investigation on the applicability of UV/sulfite reductive treatment of PFASs in sorption regenerant

Seoul National University (SNU) **Mar. 2017 – Feb. 2022**
Bachelor of Science in Chemistry (cum laude) *Seoul, South Korea*
Thesis: Synthesis of less rigid ^{acri}PNP ligand to offer enhanced reactivity toward carbonyl conversion

Research Experience

Metabolism-Carbon Modeling Group (Prof. Jooyoung Park) **Mar. 2024 – Present**
Research Intern *SNU*

- Conducted annual MFA of food-related nitrogen in Korea
- Incorporated ten processes for MFA including crop production, feed industry, human consumption, water treatment, etc.

Sustainable Environmental Technology Lab (Prof. Jong Kwon Choe) **Mar. 2021 – Present**
Post-master Fellow (Mar. 2024 – Present) *SNU*
Research Assistant (Mar. 2022 – Feb. 2024)
Undergraduate Research Intern (Mar. 2021 – Feb. 2022)

- Conducted batch experiment and rapid small-scale column test (RSSCT) to investigate sorption removal of PFAS in industrial wastewater
- Examined inhibition mechanisms of sorption regenerant components during UV/sulfite treatment of PFAS
- Conducted non-target screening analysis of byproducts from PFAS degradation using liquid chromatography with tandem mass spectrometry (LC-MS-MS)
- Compared field-implementation strategies to mitigate inhibition caused by regenerant components in UV/sulfite treatment of PFAS
- Enhanced nuclear magnetic resonance (NMR) data quality using principal component analysis (PCA)
- Synthesized metal-organic-framework (MOF) catalyst for visible-light induced PFAS degradation

Inorganic Molecular Conversion Lab (Prof. Yunho Lee) **Jun. 2020 – Feb. 2021**
Undergraduate Research Intern *SNU*

- Synthesized phenyl derivative of ^{acri}PNP ligand for the reduction of CO_2 into carbonyl compounds

Synthetic Organic Chemistry Lab (Prof. Hong Geun Lee) **Jun. 2019 – Feb. 2020**
Undergraduate Research Intern *SNU*

- Synthesized chiral ligand to induce enantioselective N-centered conjugate addition to alkene
- Presented research at the Fall 2019 Department of Chemistry Undergraduate Poster Session

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PUBLICATION

- Jaehee Kim, Taeyeon Kim, Heungjoo Park, Moon-Kyung Kim, Soyeon Eom, **Yerin Choe**, Jong Kwon Choe, Kyung-Duk Zoh (2024) Kinetics and proposed mechanisms of hexafluoropropylene oxide dimer acid (GenX) degradation via vacuum-UV (VUV) photolysis and VUV/sulfite processes, *Journal of Hazardous Materials* 463, 132864. https://doi.org/10.1016/j.jhazmat.2023.132864
- Yiseul Hong, **Yerin Choe**, Jooyoung Park (In progress) Food-related nitrogen flow analysis in Korea, 2021
- **Yerin Choe** & Jong Kwon Choe (In progress) Advanced treatment of per- and polyfluoroalkyl substances (PFAS) using UV/sulfite process in sorbent regeneration system

PRESENTATION

[Oral]

- **Yerin Choe** & Jong Kwon Choe (2024, November 6-8). *The impact of organic solvents and inorganic salts on the treatment of per- and polyfluoroalkyl substances and strategies for mitigation* [In-person oral presentation]. 2024 Korean Society of Environmental Engineers Conference, Yeosu, South Korea.
- **Yerin Choe** & Jong Kwon Choe (2023, August 16-21). *Influence of regenerant conditions on degradation and defluorination efficiency of UV/sulfite reductive treatment of PFASs in sorption regenerant* [In-person oral presentation]. ACS Fall 2023, San Francisco, CA, United States.

[Poster]

- **Yerin Choe** & Jong Kwon Choe (2022, November 8-11). *Investigation on photoreductive degradation products and degradation mechanisms of perfluorooctane sulfonate (PFOS) using 19F NMR characterization* [In-person poster session]. 2022 Korean Society of Environmental Engineers Conference, Jeju, South Korea.

PROJECT

Adsorption-based Removal Technology and Detoxification of PFAS **Feb. 2024 – Nov. 2024**

Samsung Electronics

- Predicted the adsorbent replacement cycle of a company facility based on lab-scale column test
- Led a 3-member team in project execution, contributing to experimental design, column setup, sample analysis, data processing, and preparation of presentation materials

Comprehensive Compilation and Utilization Framework Development for Carbon Neutral Technologies Information: Energy Sector **Aug. 2024**

Korea Environment Institute

- Collected process flows and technical data on carbon-neutral technologies in the oil-refinery sector to develop a reference energy system

Super Recalcitrant PFAS Treatment Lab **Mar. 2021 – Feb. 2024**

National Research Foundation of Korea

- Explored degradation of PFAS in post-regenerant condition using UV/sulfite process
- Investigated photoreductive degradation of super recalcitrant short-chain PFAS

Precise Analysis of PFCs in G-tower Wastewater **Jul. 2023 – Dec. 2023**

Samsung Electronics

- Developed 19F NMR analysis method for detection and quantification of PFAS in wastewater
- Conducted non-target screening analysis of fluorinated compounds in wastewater

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Employment

Institute of Construction and Environmental Engineering, SNU **Sep. 2024 – Present**
Research Associate *Full-time*

Institute of Engineering Research, SNU **Mar. 2024 – Aug. 2024**
Research Assistant (Mar. 2024 – Present) *Full-time*

Skills

- LC-MS (SIM mode), LC-MS-MS (MRM, dynamic MRM, scan, product ion, precursor ion mode), IC, GC-MS, NMR spectroscopy (1D & 2D, 1H, 13C, 19F, 31P), TOC analysis, SPE, organic synthesis, openLCA
- Experience in Python, R

Leadership / Extracurricular

Volunteering Engineers & Scientists of SNU | SNU **Mar. 2021 – Feb. 2022**

- Developed assistive device for improving mobility rights of visually impaired individuals

College of Natural Sciences Student Government | SNU **Sep. 2017 – Nov. 2019**
Leader of Media and Design Team (Apr. 2019 – Nov. 2019)
Vice President (Oct. 2018 – Mar. 2019)

- Served as Vice President, directly elected by the undergraduate student body of the college
- Organized alumni career seminars, orientation camps, and a peer tutoring program
- Directed the design and production of 50+ posters and videos

Tenspoon (Non Profit Organization) | SNU **Sep. 2018 – Feb. 2019**

- Volunteered weekly at the university cafeteria in exchange of meal tickets for students in financial need

Summer Science Volunteering Camp | SNU **Aug. 2017, Aug. 2018**
Organizing committee

- Participated in planning and volunteer works for science education and mentoring programs aimed at rural youth

SNU Girls' Dance Crew (GoAheaD) | SNU **Mar. 2017 – Dec. 2022**
Vice President (Mar. 2018 – Feb. 2019)

- Directed five performance showcases involving 30 to 50 members as Vice President

Honors and Awards

Fulbright Scholarship (Alternate Candidate) **Fall 2025 –**
Fulbright Korea
Nominated for PhD studies in industrial ecology

Alumni Association Scholarship **Fall 2023, Spring 2023, Fall 2022**
Gwanak Corporation, SNU
Awarded to 3 graduate students in the department for studies in water treatment

BrainKorea21 Four Scholarship **Spring 2022**

National Research Foundation of Korea

13th Creative Design Competition for Underserved Communities **2021**

Sharing and Technologies Incorporated

Awarded Bronze Prize for developing an assistive device for visually impaired individuals

Merit-Based Scholarship **Spring 2018, Fall 2020**

SNU

Awarded 50% tuition in Spring 2018, 30% tuition in Fall 2020

Alumni Association Scholarship **Spring 2019**

Gwanak Corporation, SNU

Awarded to 10 undergraduate students in the university for remarkable dedication to student government