# Seung Woo Ko

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## Education

**Seoul National University**                                                    **September 2021 – February 2024 (Anticipated)**
*Master of Science in Data Science*                                                                          *Seoul, Korea*
- **Thesis**: Analysis on decoding strategy for camouflaged object detection and its applications

**University of Cambridge**                                                                **October 2015 – June 2019**
*Bachelor of Arts and Master of Engineering in Chemical Engineering*                          *Cambridge, United Kingdom*
- **Thesis**: Analysis of continuous flow microreactor to produce ruthenium as ammonia decomposition catalyst
- **Korea Presidential Science Scholarship**: awarded $50,000/year scholarship for four years
- **United Steel Companies Scholarship**: awarded £400 scholarship for excellent examination performance

## Research Experience

**Visual Information Processing Lab, Seoul National University**                          **January 2022 – Present**
*Graduate Researcher*                                                                                        *Seoul, Korea*
- *Molecular Representation Learning*: Developed methods to utilize molecular motifs and chemical reaction data to train molecular representation. Aided in developing physics-informed molecular representation and published a research paper in UAI 2023.
- *Object Segmentation*: Proposed a topic for computer vision class project and led a team of four students in developing novel decoding architecture for Camouflaged Object Detection (COD) task. Achieved state-of-the-art performances in COD task and submitted a research paper to CVPR 2024.
- *XAI in Drug Discovery*: Currently working on developing visualization framework for drug screening models to enhance explainability of AI-based drug discovery research.

**Process Integration and Catalyst Group, University of Cambridge**                      **October 2018 – June 2019**
*Undergraduate Researcher*                                                                   *Cambridge, United Kingdom*
- Worked in the process integration and catalysis lab as part of final year research project as an undergraduate researcher for over 15 hours per week.
- Focused on the role of ruthenium nanoparticles as ammonia decomposition catalyst and using a continuous flow reactor to produce ruthenium nanoparticles with controlled sizes.
- Successfully created ruthenium nanoparticle catalyst comparable to the state-of-art used for ammonia decomposition, which can be a stepping stone in utilizing ammonia as a safe and cost-effective storage solution for storing hydrogen.

## Work Experience

**Hyosung ITX**                                                                          **July 2018 – August 2018**
*Statistical Analyst Intern*                                                                                  *Seoul, Korea*
- Worked with statistical analysts in the smart factory team, developing statistical analysis tools, such as process management system and alarm management system. Provided these tools to various chemical factories in Korea and China, such as the Spandex factory in Guangdong, China.
- Programmed extensively in R language and created several data analysis libraries to be used in the team using R language, such as change point detection, distribution classification, and basic statistical analysis libraries.
- Aided in creating English manual guides for the process management and alarm analysis tools to be used in the Guangdong Spandex factory developed by the team.

## Publications

1. Seunghoon Yi, Youngwoo Cho, Jinhwan Sul, **Seung Woo Ko**, Soo Kyung Kim, Jaegul Choo, Hongkee Yoon, and Joonseok Lee. Towards physically reliable molecular representation learning. In *Uncertainty in Artificial Intelligence*, pages 2433–2443. PMLR, 2023

2. **Seung Woo Ko**, Seungjai Bang, Joopyo Hong, Suyoung Kim, Sungzoon Cho, Nojun Kwak, Hyun-Sin Kim, and Joonseok Lee. Ento: Decoders for decoder in camouflaged object detection. Under review at *the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2024

3. Joseph El-Kadi, Eugenio Fenoaltea Peche, **Seung Woo Ko**, and Laura Torrente-Murciano. Continuous synthesis of ruthenium nanoparticles with tuneable sizes using ruthenium nitrosyl nitrate precursor. Under review at *Reaction Chemistry & Engineering*, 2024

## Skills

**Programming Languages**: Python, R, SQL
**Technologies/Frameworks**: Linux, GitHub
**Languages**: Korean, English