Hyuk Jun Yoo

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OBJECTIVES

First graduate student of autonomous laboratory in South Korea.
My experiences widely range from hardware construction to software development (e.g. experiment planning, operating system, computer vision, crawling) for autonomous laboratory.

EDUCATION

2020-present

- M.S. & Ph.D. Department of Chemical and Biological Engineering
  - Korea University (=World Ranking #79)
  - Korea Institute of Science and Technology
- *Thesis: Autonomous Laboratory for Metal Nanoparticles Synthesis*
- Advisor: Dr. Sang Soo Han, Prof. Kwan-Young Lee
- Cumulative GPA: 4.11/4.50
- GPA (100-point scale): 95.5

2013-2020

- B.S. Department of Applied Chemistry
- Kyung Hee University, Yongin.
- Cumulative GPA: 4.00/4.50
- GPA (100-point scale): 94.3

RESEARCH INTERESTS

- AI model development for experiment planning
- Lab automation & Computer vision in chemistry lab
- Operating system for autonomous laboratory
- Nanomaterial design

SKILLS

Professional skills

- (AI Optimization) Python, Pytorch, Tensorflow, Scikit-learn…etc machine learning tool.
- (Hardware) Arduino, Raspberry Pi, Fusion360, C/C++
- (Hardware + OS) Socket, TCP/IP protocol
- (Data management) MongoDB, JSON hierarchy structure
- (User Interface) HTML, CSS, JavaScript, Django
- (Crawling, Data mining) BeautifulSoup, Scrapy, Selenium
- (Experiment) Metal nanoparticle synthesis
- (Experiment) Image analysis of SEM, TEM

Soft skills

- Responsibilities
- Challenge
- Time management
- Teamwork
- Adaptability

PUBLICATIONS LIST

Publications († = Equal contribution, * = Corresponding author)

Jun 2024	**Yoo, H. J.**[‡], Lee, K-Y.[*], Kim, D.[*] and Han, S. S.[*] (under revision) OCTOPUS: Operation Control System for Task Optimization and Job Parallelization via a User-Optimal Scheduler
Feb 2024	**Yoo, H. J.**[*†], Kim, N.[*†], Lee, H., Kim, D., Ow, L. T. C., Nam, H., ... & Lee, K-Y.[*], Kim, D.[*] and Han, S. S.[*] (2024). Bespoke Metal Nanoparticle Synthesis at Room Temperature and Discovery of Chemical Knowledge on Nanoparticle Growth via Autonomous Experimentations. *Advanced Functional Materials*, **34**, 2312561. (Front Cover)
Feb 2024	Tiong, L. C. O.[*†], **Yoo, H. J.**[*†], Kim, N., Kim, C., Lee, K. Y.[*], Han, S. S.[*], & Kim, D[*]. (2024). Machine vision-based detections of transparent chemical vessels toward the safe automation of material synthesis. *npj Computational Materials*, **10** (1), 42.

Manuscripts in preparation († = Equal contribution, * = Corresponding author)

1. **Yoo, H. J.**, Lee, K-Y.[*], Kim, D.[*] and Han, S. S.[*] (in prep) Synthesis Order/Condition Optimization for Chemical Knowledge Transfer via Autonomous Experimentations
2. Kim, N.[*†], **Yoo, H. J.**[*†], Lee, K-Y.[*], Kim, D.[*] and Han, S. S.[*] (in prep). AI based Exploration on Synthesizable Space for Autonomous Laboratory.

PRESENTATIONS

International conference presentations

July 2023	**[Poster]** **Yoo, H. J**.[†], Kim, N.[†], Lee, H., Kim, D., Ow, L. T. C., Nam, H., ... & Han, S. S. "Chemistry Discovery in Nanoparticle Synthesis via Autonomous Laboratory", *2023 Nanokorea*
Nov 2022	**[Poster]** **Yoo, H. J**.[†], Kim, N.[†], Kim, D., & Han, S. S. "Autonomous Laboratory for Bespoke Synthesis of Nanoparticles", *2023 MRS Fall meeting*
Nov 2022	**[Poster]** **Yoo, H. J**.[†], Kim, N.[†], Lee, H., Kim, D., Ow, L. T. C., Nam, H., ... & Han, S. S. "AI-Robotics Based Bespoke Synthesis Planning of Ag Nanoparticle, Automation vs Autonomy", *2022 International Conference on Electronic Materials and Nanotechnology for Green Environment*

Domestic conference presentations

Apr 2024	**[Oral]** **Yoo, H. J**.[‡], Kim, N.[†], Lee, H., Kim, D., Ow, L. T. C., ... & Han, S. S. "Bespoke Metal Nanoparticle Synthesis at Room Temperature and Discovery of Chemical Knowledge on Nanoparticle Growth Via Autonomous Experimentations", *2024 KIChjE Spring Meeting*
Apr 2023	**[Oral]** **Yoo, H. J**.[‡], Kim, N.[†], Lee, H., Kim, D., Ow, L. T. C., ... & Han, S. S. "Chemistry understanding and discovery in bespoke nanoparticle synthesis via autonomous laboratory with early stopping", *2023 Spring Conference of the Korean Institute of Metals and Materials*

HONORS AND AWARDS

Aug 2024	**[Scholarship]** Best Performance Award, *2024 KIST Scholarship* *This scholarship was the biggest competition between graduated students in KIST ($3,000)
Apr 2024	**[Oral]** Best Award, *2024 Spring Conference of the KIChE Spring Meeting* Title: "Bespoke Metal Nanoparticle Synthesis at Room Temperature and Discovery of Chemical Knowledge on Nanoparticle Growth via Autonomous Experimentations"
Aug 2023	**[Poster]** Best Award, *2023 Nanokorea* Title: "Chemistry Discovery in Nanoparticle Synthesis via Autonomous Laboratory"
Apr 2023	**[Oral]** Best Award, *2023 Spring Conference of the Korean Institute of Metals and Materials* Title: "Chemistry Understanding and Discovery in Bespoke Nanoparticle Synthesis via Autonomous Laboratory with Early Stopping"
Nov 2022	**[Poster]** Best Award, *2022 International Conference on Electronic Materials and Nanotechnology for Green Environment* Title: "AI-Robotics Based Bespoke Synthesis Planning of Ag Nanoparticle, Automation vs Autonomy"

Update in Sep, 10th, 2024