Curriculum Vitae

Name	Hyuk Jun Yoo
Date of Birth	11/12/1994
Gender	Male
Nationality	Republic of Korea
E-mail	yoohj9475@kist.re.kr
Homepage	https://yoomambo.github.io/
	https://www.linkedin.com/in/hyuk-jun-yoo
	https://github.com/yoomambo
Telephone	(office) 02-958-5498
	(cell-phone) 010-2481-4877

Research Interests

- AI model development for experiment planning
- Lab automation
- Operating system for autonomous laboratory
- Nanoparticle design via closed-loop experiments
- Computer vision for lab safety protocol
- Retrosynthesis for organic reaction *(in future)*

Affiliation

Master & Ph. D. Course Student in

- Catalysis & Reaction Engineering Laboratory, Department of Chemical and Biological Engineering, Korea University 145, Anam-ro, Seongbuk-gu, Seoul 02841, Republic of Korea
- Computational Science Research Center, Korea Institute of Science and Technology (KIST) 5, Hwa-rang-ro 14-gil, Seongbuk-gu, Seoul 02792, Republic of Korea

Education

2020-presents M.S. & Ph.D course

- **Computational Science Research Center, Korea Institute of Science and Technology** (KIST), Seoul, Republic of Korea (Advisor: Dr. Sang Soo Han)
- **Catalysis & Reaction Engineering Laboratory, Department of Chemical and Biological Engineering, Korea University**, Seoul, Republic of Korea (Advisor: Professor Kwan-Young Lee)

2013-2020 B.S. Applied Chemistry, Kyung Hee University, Yongin, Republic of Korea

Employment Experiences

None

Personal skills and Experiences

Skills

- Python, pytorch, tensorflow, scikit-learn…etc
  - ➢ AI model development for experiment planning
  - ➢ Computer vision and deep learning for lab safety protocol
- Arduino, Raspberry Pi, Fusion360, C/C++ ➢ 3D modeling for experiment automation
- MongoDB, json hierarchy structure ➢ Material data management
- HTML, CSS, JavaScript, Django ➢ Web-based GUI
- Socket, TCP/IP protocol ➢ software for integrated experimental modules
- BeautifulSoup, Scrapy, Selenium ➢ Data crawling
- Metal nanoparticle synthesis ➢ OER catalyst (Ir-based or LDH)
- Operation of scanning electron microscopy (SEM), Image analysis of tunneling electron microscopy (TEM)

Language

- Korean : Native
- English : Intermediate

Projects

- AI-based smart laboratory for the development of water electrolysis catalyst and light-emitting quantum dots, NRF, 2022-**present** (until 2028) (Dr. Seung Yong Lee)
- Materials Research Data Platform Construction Project, NRF, 2022-**present** (until 2028) (Dr. Sang Soo Han)
- Samsung Future Technology Development Program, Samsung, 2020-2022 (Dr. Sang Soo Han)
- Future Materials Discovery Project, NRF, 2020-2022 (Dr. Sang Soo Han)

Publications and Presentations

Publications († = Equal contribution)

1. **Yoo, H. J**.†, Kim, N.†, Lee, H., Kim, D., Ow, L. T. C., Nam, H., ... & 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*, 2312561.
2. 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.
3. **Yoo, H. J**.†, Lee, K-Y., Kim, D. and Han, S. S. (2024) OCTOPUS: Operation Control System for Task Optimization and Job Parallelization via a User-Optimal Scheduler, *Submitted*

International Conference Presentations

1. **[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 (2022 ENGE)* (November. 6-9, 2022; Jeju, Republic of korea).
2. **[Poster]** **Yoo, H. J**.†, Kim, N.†, Kim, D., & Han, S. S. "Autonomous Laboratory for Bespoke Synthesis of Nanoparticles", *2023 MRS Fall meeting* (November 26-December 1; Boston, U.S.A)
3. **[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* (July. 5-7, 2023; Ilsan, Republic of Korea).

Domestic Conference Presentations

1. **[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* (April. 25-28, 2023; Jeju, Republic of Korea).
2. **[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* (April. 24-26, 2024; Jeju, Republic of Korea).

Honors and Awards

- Best **Poster** Award, *2023 Nanokorea* (August, 2023; Ilsan, Republic of Korea)
- Best **Oral** Award, *2023 Spring Conference of the Korean Institute of Metals and Materials* (April, 2023; Jeju, Republic of Korea)

- Best **Poster** Award, *2022 International Conference on Electronic Materials and Nanotechnology for Green Environment (2022 ENGE)* (November, 2022; Jeju, Republic of Korea)

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