



Sungboo Yoon

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RESEARCH INTERESTS

Construction Robotics, Human-Robot Interaction, Machine Learning

EDUCATION

- **Seoul National University** 2022 - Present
Ph.D. in Architectural Engineering
◦ Advisor: Dr. Changbum R. Ahn Seoul, South Korea
- **Seoul National University** 2020 - 2022
M.S. in Architectural Engineering
◦ Thesis: "Challenges in Spatial Communication Using Deictic Gesture for Human-Robot Collaboration in Construction"
◦ Advisor: Dr. Moonseo Park Seoul, South Korea
- **Seoul National University** 2014 - 2022
B.S. in Architectural Engineering
◦ Graduated with honors (Cum Laude) Seoul, South Korea

EXPERIENCE

- **Seoul National University, Department of Architecture & Architectural Engineering**  Sep 2022 - Present
Graduate Research Assistant
◦ Human-Robot Interaction Design in Construction Seoul, South Korea
- **Seoul National University, Institute of Construction and Environmental Engineering**  Mar 2022 - Aug 2022
Research Associate Seoul, South Korea
- **Seoul National University, Department of Architecture & Architectural Engineering**  Mar 2020 - Feb 2022
Research Assistant Seoul, South Korea
 - **Technical Development of Modular Construction in Mid-High Rise Building and Higher Productivity**
 - Developed an multi-objective optimization model for layout planning of heavy equipment
 - Developed the modular construction management and information system (MoMIS) and collected user feedback from site managers
- **Daewoo E&C**  Dec 2018 - Jan 2019
Intern Seongnam, South Korea
- **Korean National Police Agency, Public Security Division** Jul 2016 - Apr 2018
Sergeant Seoul, South Korea


PATENTS AND PUBLICATIONS

J=JOURNAL, C=CONFERENCE, N=NON-REFERRED ARTICLE, P=PATENT, T=THESIS


- [J.4] Lee, C., Yoon, S., Park, M., & Ahn, C. R. (2024). **Interpreting Spatial Instructions for Effective Human-Robot Communication in Construction Environments**. *Journal of Construction Automation and Robotics*, 3(3), 6-13.
- [J.3] Yoon, S., Park, M., & Ahn, C. R. (2024). **LaserDex: Improvising Spatial Tasks Using Deictic Gestures and Laser Pointing for Human-Robot Collaboration in Construction**. *Journal of Computing in Civil Engineering*, 38(3), 04024012. (Invited paper, Editor's choice)
- [J.2] Yoon, S., Kim, Y., Park, M., & Ahn, C. R. (2023). **Effects of Spatial Characteristics on the Human-Robot Communication Using Deictic Gesture in Construction**. *Journal of Construction Engineering and Management*, 149(7), 04023049.
- [J.1] Yoon, S., Park, M., Jung, M., Hyun, H., & Ahn, S. (2024). **Multi-objective Optimization Model for Tower Crane Layout Planning in Modular Construction**. *Korean Journal of Construction Engineering and Management*, 22(1), 36-46.
- [C.4] Yoon, S., Shin, S., Lee, S., Park, M., & Ahn, C. R. (2024). **Evaluating Viewpoint Control Techniques in Virtual Reality Interface for Teleoperating Construction Welding Robots**. In *In Proceedings of the 31st International Workshop on Intelligent Computing in Engineering*. (Recognized as a top paper and invited to the special issue of the Advanced Engineering Informatics)
- [C.3] Yoon, S., Park, J., Park, M., & Ahn, C. R. (2024). **A Deictic Gesture-Based Human-Robot Interface for In Situ Task Specification in Construction**. In *Computing in Civil Engineering 2023* (pp. 445-452). (Recognized as a top paper and invited to the special issue of the Journal of Computing in Civil Engineering)

- [C.2] Heo, C., Ahn, C. R., Yoon, S., Jung, M., & Park, M. (2022). **Measuring the Impact of Supply Network Topology on the Material Delivery Robustness in Construction Projects**. In *The 9th International Conference on Construction Engineering and Project Management (ICCEPM)*.
- [C.1] Yoon, S., Kim, Y., Ahn, C. R., & Park, M. (2021). **Challenges in Deictic Gesture-Based Spatial Referencing for Human-Robot Interaction in Construction**. In *ISARC. Proceedings of the International Symposium on Automation and Robotics in Construction* (Vol. 38, pp. 491-497). IAARC Publications.
- [N.1] Ahn, C. R. & Yoon, S. (2022). **Intelligent Robots in Construction**. *Review of Architecture and Building Science*, Vol. 66, No. 10, 40-43.
- [P.4] Ahn, C. R. & Yoon, S., **Symbiotic Human-Robot Interface Using Augmented Reality for Shared Control and On-Site Work Instruction of Intelligent Construction Robots**. 10-2022-0094853, Date of Patent: July 29, 2022.
- [P.3] Park, M., Ji, S., Yoon, S., Ahn, S., Jeong, G., & Jung, W., **System and method for site management of modular construction**. 10-2022-0097873, Date of Patent: July 29, 2022.
- [P.2] Park, M., Ji, S., Yoon, S., Ahn, S., Jeong, G., & Jung, W., **System and method for managing lifting plan of modular construction**. 10-2022-0094855, Date of Patent: July 29, 2022.
- [P.1] Park, M., Ji, S., Yoon, S., Ahn, S., Jeong, G., & Jung, W., **System and method for managing modular construction project schedule**. 10-2022-0094854, Date of Patent: July 29, 2022.
- [T.1] Yoon, S. (2022). **Challenges in Spatial Communication Using Deictic Gesture for Human-Robot Collaboration in Construction** (Seoul National University).

HONORS AND AWARDS

- **Editor's Choice Article** May 2024
ASCE Journal of Computing in Civil Engineering 
 ◦ Paper Title: "LaserDex: Improvising Spatial Tasks Using Deictic Gestures and Laser Pointing for Human-Robot Collaboration in Construction." Yoon, S., Park, M., and Ahn, C. R. (2024).
- **Graduate Fellowship** 2023
Foundation for Industrial Safety Partnerships
- **Graduate Fellowship** 2023
Engineering Research Foundation
- **Dean's List** 2022 - 2023
Seoul National University
- **Graduate Fellowship** 2020
Hanssem DBEW Research Foundation
- **Second Place Award** 2019
Graduation Exhibition, Seoul National University
- **Second Place Award** 2019
Mooyoung CM Competition, Mooyoung CM
- **Dean's List** 2022 - 2019
Seoul National University

LEADERSHIP EXPERIENCE

- **Student Member** 2023 - Present
Data, Sensing and Analysis (DSA) committee, ASCE 
- **Student Member** 2022 - Present
American Society of Civil Engineers (ASCE)
- **Member** 2020 - Present
Korea Institute of Construction Engineering and Management
- **Member** 2020 - Present
Architectural Institute of Korea (AIK)

TEACHING EXPERIENCE

- **Research Mentor** 2022 - Present
Construction Engineering and Management Lab, Seoul National University
 - **Mentee: Chaeun Lee** (M.S. student in Architectural Engineering)
 - **Mentee: Seungmin Shin** (M.S. student in Architectural Engineering)

SKILLS

- **Programming Languages:** Python, C++, C
- **Mathematical & Statistical Tools:** R
- **Other Tools & Technologies:** Unity, ROS
- **Research Skills:** Engineering