

Jihoon Chung, WELL AP, LEED GA

CONTACT INFORMATION

Center for Architecture Science and Ecology
Rensselaer Polytechnic Institute
New York, United States

Tel: +1 (347) 204-2049
E-mail: chungj11@rpi.edu
<https://j-chung.kr/>

RESEARCH INTERESTS

Building Information Modeling / Internet of Things / Ontology
occupant behavior modeling, indoor environmental quality, building energy simulation, building monitoring system, interoperability, parametric design, machine learning, deep learning, computer vision (object detection, facial recognition), natural language process (text classification)

EDUCATION

Rensselaer Polytechnic Institute, New York, United States

Ph.D., Architectural Science (Built Ecologies), GPA: 4.0/4.0, August 2021 – Current

- Advisor: Dr. Dennis Shelden
- Expected Graduation: June 2025

M.S., Architecture (Design Technology), GPA: 4.0/4.0, August 2021 – Current

- Advisor: Dr. Dennis Shelden
- Expected Graduation: December 2023

Graduate Certificates, January 2022 – Current

- Machine Learning & AI, Business Intelligence, and Systems Engineering

Yonsei University, Seoul, Korea

M.S., Architectural Engineering (Construction IT), GPA: 3.97/4.0, February 2021

- Thesis: “Technical Specification Framework for 3D Concrete Printers”
- Advisor: Dr. Ghang Lee

B.Arch, Architecture (5-year program), February 2019

- Thesis: “Haebang-ro: Relationship between Haebang-chon and Yongsan Park”
- Advisor: Moongyu Choi, AIA & KIRA

National University of Singapore, Singapore

Exchange Program for a year in AY2017

Gunmyungwon (건명원), Seoul, Korea

Future New School of Humanities, Arts & Science, February 2016

RESEARCH & WORK EXPERIENCE

Center for Architecture Science and Ecology, New York

August 2021 – Current

Research Assistant

- Developed a web-based monitoring system for indoor air quality based on BIM & IoT
- Proposed an ontology recommending a viable solution to improve indoor environmental quality for multiple occupants and reduce energy use in a room
- Designed Arduino circuit boards and developed a web server for IoT-based plant modules to automatically manage the plant health and improve indoor air quality as a part of Plant Pixel project sponsored by OBMI

Autodesk, New York

May 2023 – August 2023

Intern, Sustainable Active and Passive Mechanical Systems Simulation and Optimization

- Explored integration of generative design process with natural ventilation simulation for evaluating the performance of the ventilation systems at the early design stage using OpenStudio/EnergyPlus
- Volunteered to support AEC Mentor Program for underrepresented-minority teenagers who participated in a paid two-week internship at Autodesk's Boston office

Saman Corporation, South Korea
Researcher

February 2021 – July 2021

- Planned application services using real-time data collected from IoT sensors on construction sites in a national research project 'Development of and digital twin platform for smart construction'
- Assisted to prepare kick-off meetings and presentations in a national research project 'XR Flagship Project (Construction part)'
- Wrote bills of quantities in a pilot design project on a box culvert organized by Korea Expressway Corporation

Building Informatics Group, Yonsei University
Research Assistant

February 2018 – January 2021

- Proposed a technical specification framework for 3D concrete printers through a systematic literature review and a Delphi study
- Developed a multi-dimensional classification algorithm for housing defect text data using BERT-based multitask learning technique (Recurrent Neural Network)
- Explored optimization algorithm for buildability of 3D concrete printing focused on operation planning and concrete properties

ATEAM Ventures, South Korea
Strategic Planning staff

May 2015 – August 2015

- Planned strategies for marketing & sales and held a 3D-printer exhibition at KINTEX, Ilsan
- Installed a factory to assemble 3D-printers and managed mechanical components
- Managed all customer inquiries, wrote customer manuals, and sent thank-you letters to early customer

XbarX (X_X), South Korea
Sales Director & Co-founder

May 2014 – February 2015

- Launched a beer recommendation app and beer-distribution web platform
- Got partnership with 218 beer pub, bar, and restaurant in Seoul, South Korea
- Got a shared 3rd award with a \$4,500 cash prize in 'The 3rd Chung Ju-young Start-up Competition' and funding, \$140,000 from a start-up accelerator

TEACHING
& MENTORING
EXPERIENCE

Rensselaer Polytechnic Institute, New York
Project Mentor

August 2021 – Current

- Taught and led an undergraduate group in a research-oriented class 'Research Investigation' (Fall 2022 & Fall 2023)
- Advised an undergraduate to develop an algorithm evaluating plants' health using a color sensor as a part of the Plant Pixel project sponsored by OBMI (Fall 2023)
- in an interdisciplinary project 'Smart Dormitory Devices and Development System' (Fall 2022, Spring 2023 & Fall 2023)
- Provided advice to undergraduates in an interdisciplinary project 'Smart Dormitory Devices and Development System' (Fall 2022, Spring 2023 & Fall 2023)
- Participate in *Smart City Hackathon 2023* organized by Tech Valley Center of Gravity as a microcontroller-knowledgeable mentor (October 13-15, 2023)

Workshop Instructor

- 'Build an IoT Monitoring System for Your Smart Home' at Black Families Technology Awareness Day (February 12, 2022 & February 4, 2023)

Franklin D Roosevelt High School & Microsoft TEALS, New York
Programming Teaching Assistant

August 2023 – Current

- AP Computer Science Principles (Fall 2023)

First East Brooklyn High School & Code Nation, New York

August 2022 – Current

Programming Teaching Assistant

- Intro to Web Development (AY 2022-2023)
- Fellowship I (JavaScript/jQuery, Fall 2023)

Yonsei University, South Korea

March 2019 – June 2020

Teaching Assistant

- Engineering-Information Processing (Spring 2020)
- Computer Lab Manager (Spring 2019)

PUBLICATIONS

(Submitted) Chung, J., Shahmansouri, N., Stoddart, J., Goldstein, R., and Locke, J. (2024) "Sustainability through Optimal Design of Buildings for Natural Ventilation using Updated Comfort and Occupancy Models" *Proceedings of International Building Performance Simulation Association – USA and SimBuild 2024*

Chung, J., Tsamis, A., and Shelden, D. (2023) "A framework for monitoring and identifying indoor air pollutants based on BIM with IoT sensors" *Proceedings of Computer-Aided Architectural Design. INTERCONNECTIONS: Co-computing beyond boundaries: 20th International Conference, CAAD Futures 2023*, pp. 518-531, Delft, Netherlands, 5 Jul., https://doi.org/10.1007/978-3-031-37189-9_34

Chung, J., Jacoby-Cooper, G., Rook, K., Henrique, S., Shelden, D., Kendall, E., and McGuinness, D. (2023) "Towards an Indoor Environmental Quality Management Ontology" *Proceedings of First International Workshop on Semantic Web on Constrained Things @ ESWC-23 (SWoCoT-23)*, pp. 16-26, Hersonissos, Greece, 28 May., <https://hdl.handle.net/20.500.13015/6674>

Lee, G., **Chung, J.,** and Kim, J. (2021) "On What Basis Should We Buy a 3D Concrete Printer?" *Building Construction*, 21(4), 31-34.

Chung, J., Lee, G., and Kim, J. (2021) " Framework for Technical Specifications of 3D Concrete Printers" *Automation in Construction*, 127, 103732, <https://doi.org/10.1016/j.autcon.2021.103732>

(Submitted) Woo, J., Chung, J., and Koo, H. (2021) " A Study on the Pedestrian Route Choices and Accessibility in the Retail Areas after Acute COVID-19: Focused on the Peak Commercial Activity's Hours in the Mangwon District" *Journal of the Urban Design Institute of Korea*

Chung, J., Lee, G., Kim, J. and Choi, J. (2020) "A Comparative Analysis of the Classification System for Three-Dimensional Concrete Printers" *Korean Journal of Construction Engineering and Management*, 21(2), 3-14, <https://doi.org/10.6106/KJCEM.2020.21.2.003>

Chung, J., Lee, G., and Kim, J. (2020) "A Systematic Review of the Geographic and Chronological Distributions of 3D Concrete Printers from 1997 to 2020", *Proceedings of the 37th International Symposium on Automation and Robotics in Construction (ISARC)*, pp. 84-19, Kitakyushu, Japan, 27-28 Oct., <https://doi.org/10.22260/ISARC2020/0014>

Lee, G., Cho, J., Song, T., Roh, H., Jung, J., **Chung, J.,** Yong, G., and Jeong, D. (2020) "Construction Field Management Using a Popular Text Messenger" *Proceedings of the 18th International Conference on Computing in Civil and Building Engineering*, pp. 971-979, https://doi.org/10.1007/978-3-030-51295-8_67

Chung, J., Lee, G., and Kim, J. (2018), "Performance Evaluation Criteria for Building 3D Printing Focused on Concrete Properties", *Proceedings of the 2018 Annual Conference of the Korea Institute of Construction Engineering and Management*, pp. 27-29, South Korea, 9 Nov.

PATANT

Kim, J., Lee, G., Lee, D., Lee, J., **Chung, J.** (2020), "3D printer for construction with continuous printing on the go and 3D printing system comprising it", Application Serial No. KR20200101482A, South Korea, <https://patents.google.com/patent/KR20200101482A/ko>

**HONORS
& AWARDS**

Graduate Research Symposium (Podium Presentations) , The 3 rd Prize <i>Rensselaer Polytechnic Institute, New York</i>	June 2022
Research Assistantship Award for 2021-2024 academic year <i>Rensselaer Polytechnic Institute, New York</i>	August 2021
The 17th Outstanding Thesis Competition , Honorable Mention <i>Architectural Institute of Korea, South Korea</i>	April 2021
2019 Yonsei Startup Lab Contest (\$2,700) , Best Startup Award <i>Yonsei University, South Korea</i>	July 2019
2018 KICEM Annual Conference , Excellent Paper Award <i>Korea Institute of Construction Engineering and Management, South Korea</i>	November 2018
Academic Scholarships for four semesters <i>Yonsei University, South Korea</i>	March 2016 – September 2018
The 12th Architectural Engineering Competition , Excellent Award <i>The Korean Structural Engineers Association, South Korea</i>	September 2016
Volunteer Full-Scholarship for two semesters <i>Dongbu Foundation, South Korea</i>	March & September 2016
The 3rd Chung Juyung Startup Competition (\$4,500) , Excellent Startup Award <i>The Asan Nanum Foundation, South Korea</i>	August 2014
The 18th National Boxing Competition for Non-Athlete , The 1 st Prize <i>Korea Boxing Institution, South Korea</i>	August 2012
Chief Superintendent's Award for Leadership <i>Seoul Metropolitan Office of Education, South Korea</i>	May 2011

**PRESENTATIONS
& INVITED TALKS**

Daily Flooding Risk Assessment Map for Medical Infrastructures Using Machine Learning Algorithms <i>AGU23 Fall Meeting [Poster]</i>	January 25, 2024
A framework of BIM & IoT-based Building Infrastructure for Monitoring Indoor Air Quality and Occupant Behavior <i>Research Showcase — Reunion & Homecoming 2023, RPI</i>	October 13, 2023
Sustainability through Optimal Design of Buildings for NV and Post-Occupancy Using Updated Comfort Models <i>Research Connections — Summer Intern Series, Autodesk</i>	August 17, 2023
Daily Flooding Risk Assessment Map for Medical Infrastructures using Machine Learning Algorithm <i>AmeriGEO Week 2023 'Data Driven Solutions for a Sustainable Planet' [Poster]</i>	August 8, 2023
A framework for monitoring and identifying indoor air pollutants based on BIM with IoT sensors <i>20th International Conference of CAAD Futures 2023 [Oral]</i>	July 7, 2023
Towards an Indoor Environmental Quality Management Ontology <i>2023 8th Annual Graduate Research Symposium, RPI [Oral]</i>	May 12, 2023
A framework for monitoring and identifying indoor air pollutants based on BIM with IoT sensors <i>2023 8th Annual Graduate Research Symposium, RPI [Poster]</i>	May 12, 2023
Air Quality Monitoring System based on BIM & IoT <i>EBESS Industry Workshop 'Well-being & Sustainability in the Built Environment', RPI [Poster]</i>	November 2, 2022

Air Quality Monitoring System based on BIM & IoT <i>2022 Three Minute Thesis, RPI [Oral]</i>	May 13, 2022
Air Quality Monitoring System based on BIM & IoT <i>2022 7th Annual Graduate Research Symposium, RPI [Poster, Oral – 3rd Place]</i>	May 13, 2022
A Systematic Review of 3D Concrete Printers from 1997 to 2020 <i>37th International Symposium on Automation and Robotics in Construction (ISARC) [Oral]</i>	October 28, 2022
Performance Evaluation Criteria for Building 3D Printing <i>2018 Annual Conference of KICEM [Oral]</i>	November 30, 2018

CERTIFICATIONS	WELL AP <i>International WELL Building Institute (IWBI)</i>	February 6, 2023
	LEED Green Associate <i>U.S. Green Building Council</i>	August 13, 2022
	2020 AI Technical Development Workshop (Image/Video Recognition) <i>Korea Electric Power Corporation (KEPCO)</i>	August 7, 2020
	The 9th Image Recognition Application Workshop <i>Fast Campus (패스트캠퍼스)</i>	October 19, 2019
	The 3rd Object Detection Application Workshop <i>Fast Campus (패스트캠퍼스)</i>	September 7, 2019
	DA BIM Specialist Intermediate Workshop <i>DAGROUP Urban Design & Architecture Co., Ltd</i>	July 14, 2019
	2018 BIGDATA X CAMPUS (Python-based Big Data Analysis) <i>Korea Data Agency</i>	June 14, 2018

ACADEMIC SERVICE	Reviewer <ul style="list-style-type: none">IBPSA-USA SimBuild 2024
	Invited Juror <ul style="list-style-type: none">Architectural Drawing & Representation at GSAPP, Columbia University (Fall 2023)

SKILLS	<p>Programming Languages: Python, C#, JAVA, C++, JavaScript (Node.js, Three.js, ifc.js, Express.js, Node-RED), P5 Processing, SPARQL, SQL</p> <p>CAD/CAE: Rhino (+Grasshopper, Ladybug, Honeybee, Butterfly), Revit(+Dynamo, Ladybug, Honeybee, Butterfly), Sketchup, CATIA, AutoCAD, Midas Civil</p> <p>Design tools: Adobe Photoshop, Illustrator, InDesign, Premiere Pro, Experience Design</p> <p>Machining: Arduino, Raspberry Pi, 3D printer, Laser Cutter</p> <p>Others: OpenStudio (+EnergyPlus), NetLogo (+PyNetLogo), Tensorflow(+Keras), Pytorch, SPSS, Protégé</p>
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LEADERSHIP
EXPERIENCE

- Project leader**, Social Algorithm 7.0 Workshop **August 2020**
- Led a team project in an international online-workshop organized by Social Algorithm Research Group
 - Analyzed spatial network using Rhino + Grasshopper with Python, and conducted on-site surveys for the validation
 - Based on the analysis result, submitted a journal article to *Journal of the Urban Design Institute of Korea*
- Casting Director & Co-founder**, We Ask, Korea **January 2013 – September 2014**
- Co-founded a conference-planning organization called '젊음이 묻습니다', gathering 100+ NGO-interested students
 - Invited 30+ celebrities to have talks with students, such as Im Kwon-taek, Ko Un, Kim Jung-man, and so on
 - Got sponsorships from publishers, theatres, and student councils to implement marketing plans
- The 9th Chief Representative**, Global Intelligence, Korea **January 2012 – July 2013**
- Directed a volunteer group consisting of 69 college students to organize mentoring programs for teenagers

VOLUNTEER
EXPERIENCE

- Y-Zone Project** in STEM Alliance, New York **October 2021 – September 2022**
Bilingual (Korean/English) Volunteer Translator
- Major Mentoring Program** in Yonsei University, Korea **March 2019 – May 2021**
Architecture-Major Mentor
- Architecture School** in Junglim Foundation, Korea **August 2018 – October 2018**
Architecture Tutor
- Global Volunteering Program** in Dongbu Foundation, Vietnam **January 2017**
Student Volunteer
- Student Volunteer Group** in Dongbu Foundation, Korea **February 2016 – February 2017**
Volunteer & Scholarship Holder
- Global Engineering Program** in Yonsei University, Indonesia **August 2016**
Student Volunteer & Assistant Manager
- Seoul Junghwa Secondary School**, Korea **September 2012 – December 2012**
Speech Tutor
- Seoul Soongduck Primary School**, Korea **March 2012 – July 2013**
Speech Tutor
- Kyoto International School**, Japan **August 2012**
Korean Tutor

REFERENCES

Available upon request.