Jihoon Chung, WELL AP, LEED GA

CONTACT INFORMATION

Center for Architecture Science and Ecology
Rensselaer Polytechnic Institute
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RESEARCH INTERESTS

Building Information Modeling / Internet of Things / Ontology
occupant behavior modeling, indoor environmental quality, building energy simulation, building monitoring system, interoperability, semantic web, parametric design, machine 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, December 2023
- Advisor: Dr. Dennis Shelden

Graduate Certificates, GPA: 4.0/4.0, 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

Lawrence Berkeley National Laboratory, California **January 2024 – Current**
Research Affiliate
- Exploring developing a web platform for real-time energy simulation using EnergyPlus, occupant behavior simulator (obFMU), and sensor data
- Developing a data-driven occupant behavior simulator by integrating BIM and IoT
- Hosted by Dr. Tianzhen Hong

Center for Architecture Science and Ecology, New York **August 2021 – Current**
Research Assistant
- Developed a web-based monitoring system for occupant behavior based on BIM, IoT, building automation system, and semantic web technologies
- 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 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 **February 2021 – July 2021**
Researcher

- 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 **February 2018 – January 2021**
Research Assistant

- 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 defesct 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 **May 2015 – August 2015**
Strategic Planning staff

- 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 **May 2014 – February 2015**
Sales Director & Co-founder

- 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 **August 2021 – Current**
Guest Lecturer

- Internetworking of Things, ECSE-4660/ECSE-6660 (February 23, 2024)

Project Mentor

- Taught and led an undergraduate group in a research-oriented class 'Research Investigation (ARCH-4958)' (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)
- Provided advice to undergraduates in an interdisciplinary project 'Smart Dormitory Devices and Development System (ECSE-4900)' (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)

Microsoft TEALS, New York **August 2023 – Current**
Programming Teaching Assistant

- AP Computer Science A (Spring 2024) at El Camino High School, San Francisco, CA
- AP Computer Science Principles (Fall 2023) at Franklin D Roosevelt High School, NYC

Code Nation, New York **August 2022 – Current**
Programming Teaching Assistant

- Intro to Web Development (Spring 2024) course at Collegiate Institute for Math & Science, NYC
- Intro to Web Development (AY2022–2023) & Fellowship I (JavaScript/jQuery, Fall 2023) courses at Achievement First East Brooklyn High School, NYC

Yonsei University, South Korea **March 2019 – June 2020**
Teaching Assistant

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

PUBLICATIONS

(Accepted) **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*

(Accepted) **Chung, J.** and Shelden, D. (2024) "A Framework of ifcJSON-based Web Platform for Monitoring Building Environment using BIM, IoT, and Semantic Web Technologies" *Proceedings of the 20th International Society for Computing in Civil and Building Engineering*

(Submitted) **Chung, J.**, Karlicek, B., and Shelden, D. (2024) " A Framework of Occupant-Behavior Monitoring System using BIM, IoT, and BAS" *Proceedings of ASCE International Conference on Computing in Civil Engineering 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

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

***(Submitted)* Chung, J.**, Stoddart, J., Locke, J., Goldstein, R., and Shahmansouri, N. (2024) "Automated Generation and Analysis of Natural Ventilation Performance Using Tile-based Building Geometry", USA

***(Submitted)* Chung, J.**, Stoddart, J., Locke, J., Goldstein, R., and Shahmansouri, N. (2024) "Automated Comparative Analysis of Alternative Comfort and Occupancy Models in Building Energy Analysis", USA

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

ARTICLE

Chung, J. (2024) "Want To Be More Comfortable Indoors? Let Your Building Help" *Every Day Matters: RPI Blog*, [URL]

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

HONORS & AWARDS

Graduate Research Symposium (Podium Presentations), The 3rd Prize — **June 2022**
Rensselaer Polytechnic Institute, New York

Research Assistantship Award for 2021-2024 academic year — **August 2021**
Rensselaer Polytechnic Institute, New York

The 17th Outstanding Thesis Competition, Honorable Mention — **April 2021**
Architectural Institute of Korea, South Korea

2019 Yonsei Startup Lab Contest ($2,700), Best Startup Award — **July 2019**
Yonsei University, South Korea

2018 KICEM Annual Conference, Excellent Paper Award — **November 2018**
Korea Institute of Construction Engineering and Management, South Korea

Academic Scholarships for four semesters — **March 2016 – September 2018**
Yonsei University, South Korea

The 12th Architectural Engineering Competition, Excellent Award — **September 2016**
The Korean Structural Engineers Association, South Korea

Volunteer Full-Scholarship for two semesters — **March & September 2016**
Dongbu Foundation, South Korea

The 3rd Chung Juyung Startup Competition ($4,500), Excellent Startup Award — **August 2014**
The Asan Nanum Foundation, South Korea

The 18th National Boxing Competition for Non-Athlete, The 1st Prize — **August 2012**
Korea Boxing Institution, South Korea

Chief Superintendent's Award for Leadership — **May 2011**
Seoul Metropolitan Office of Education, South Korea

PRESENTATIONS & INVITED TALKS

Daily Flooding Risk Assessment Map for Medical Infrastructures Using Machine Learning Algorithms — **January 22, 2024**
AGU23 Fall Meeting [Poster]

A framework of BIM & IoT-based Building Infrastructure for Monitoring Indoor Air Quality and Occupant Behavior — **October 13, 2023**
Research Showcase — Reunion & Homecoming 2023, RPI [Poster]

Sustainability through Optimal Design of Buildings for NV and Post-Occupancy Using Updated Comfort Models — **August 17, 2023**
Research Connections — Summer Intern Series, Autodesk [Oral]

Daily Flooding Risk Assessment Map for Medical Infrastructures using Machine Learning Algorithm — **August 8, 2023**
AmeriGEO Week 2023 'Data Driven Solutions for a Sustainable Planet' [Poster]

A framework for monitoring and identifying indoor air pollutants based on BIM with IoT sensors — **July 7, 2023**
20th International Conference of CAAD Futures 2023 [Oral]

Towards an Indoor Environmental Quality Management Ontology — **May 12, 2023**
2023 8th Annual Graduate Research Symposium, RPI [Oral]

A framework for monitoring and identifying indoor air pollutants based on BIM with IoT sensors — **May 12, 2023**
2023 8th Annual Graduate Research Symposium, RPI [Poster]

Air Quality Monitoring System based on BIM & IoT — **November 2, 2022**
EBESS Industry Workshop 'Well-being & Sustainability in the Built Environment', RPI [Poster]

Air Quality Monitoring System based on BIM & IoT — **May 13, 2022**
2022 Three Minute Thesis, RPI [Oral]

Air Quality Monitoring System based on BIM & IoT — **May 13, 2022**
*2022 7th Annual Graduate Research Symposium, RPI [Poster, Oral – **3rd Place**]*

A Systematic Review of 3D Concrete Printers from 1997 to 2020 — **October 28, 2022**
37th International Symposium on Automation and Robotics in Construction (ISARC) [Oral]

Performance Evaluation Criteria for Building 3D Printing — **November 30, 2018**
2018 Annual Conference of KICEM [Oral]

CERTIFICATIONS

WELL AP — **February 6, 2023**
International WELL Building Institute (IWBI)

LEED Green Associate — **August 13, 2022**
U.S. Green Building Council

2020 AI Technical Development Workshop (Image/Video Recognition) — **August 7, 2020**
Korea Electric Power Corporation (KEPCO)

The 9th Image Recognition Application Workshop — **October 19, 2019**
Fast Campus (패스트캠퍼스)

The 3rd Object Detection Application Workshop **September 7, 2019**
Fast Campus (패스트캠퍼스)

DA BIM Specialist Intermediate Workshop **July 14, 2019**
DAGROUP Urban Design & Architecture Co., Ltd

2018 BIGDATA X CAMPUS (Python-based Big Data Analysis) **June 14, 2018**
Korea Data Agency

ACADEMIC SERVICE

Reviewer

- IBPSA-USA SimBuild 2024

Invited Juror

- Architectural Drawing & Representation at GSAPP, Columbia University (Fall 2023)

SKILLS

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

LEADERSHIP EXPERIENCE

Project leader, Rensselaer Polytechnic Institute **January 2023 – Current**

- Led a class project with six computer-science students in *Xinformatics* and *Data Science* courses aiming to develop machine learning models for predicting flood using big data from NASA, FEMA, and HIFLD
- Had poster presentations at *AGU23 Fall Meeting* and *AmeriGEO Week 2023*
- Currently working on publication with Dr. Jennifer Wei, NASA Lead Scientist, and Thilanka Munasinghe, RPI Lecturer

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 '젊음이묻습니다', 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

Lawrence Berkeley National Laboratory, California — **January 2024 – Current**
Volunteer

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.