

YOUNGSIK CHOI

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(Updated on Apr. 15, 2024)

EDUCATION

- PhD** Texas A&M University, Mechanical Engineering May 2022 – Present
Advisor: Prof. Zheng O'Neill
Committee: Prof. David Claridge, PhD; Prof. Michael Pate, PhD; Prof. Charles Culp, PhD
- MS** Seoul National University, Architecture and Architectural Engineering Mar. 2020 – Feb. 2022
Advisor: Prof. Cheol-Soo Park
Committee: Prof. Myoung-Souk Yeo, PhD; Sun Sook Kim, PhD
Thesis: *'Stochastic Setpoint Temperature Learning for Occupant Behavior-based Control'*
- BS** Seoul National University, Architectural Engineering Mar. 2014 – Feb. 2020
Graduated with honors *Cum Laude*
2-year absence to fulfill mandatory military service (Aug. 2016 – Jul. 2018)
- Peking University, College of Engineering Jul. 2016
International Exchange Student (Summer session offered in English)

FIELDS OF INTEREST

Building energy modeling, HVAC system optimal control, machine learning, carbon emission reduction

RESEARCH EXPERIENCE

- PhD Intern**, Pacific Northwest National Laboratory Jul. 2023 – Aug. 2023
- Research Assistant**, Texas A&M University May. 2022 – Present
- Research Assistant**, Seoul National University Mar. 2020 – Feb. 2022

RESEARCH PROJECTS

- High-performance Whole Building Design 3D-printed Carbon-Absorbing Funicular Structures** Jan. 2023 – Present
DOE ARPA-E HESTIA, @ Texas A&M University
- Developing EnergyPlus model for radiant system for buildings with carbon-absorbing funicular structures.
 - Exploring direct carbon capturing potential using HVAC system.
 - Investigating operational carbon emission reduction calculation.
- Optimizing Supply Air Temperature Control for Dedicated Outdoor Air Systems** May 2022 – Present
ASHRAE 1865, @ Texas A&M University
- Developing EnergyPlus model for DOAS with heat pumps, fan coils, and chilled beams.

- Developing optimization-informed rule extraction framework for DOAS supply air temperature control.
- Conducting large-scale energy performance analysis on DOAS optimal supply air temperature control.

Construction Weight Analysis Jul. 2023 – Aug. 2023

Construction Weight Analysis Project @ Pacific Northwest National Laboratory (PNNL)

- Conducted a comprehensive literature review on construction weights and bottom-up building energy modeling.

Development of Building Energy Management System Algorithms Jun. 2020 – Feb. 2021

Supported by Hyundai Development Company (HDC) I-Controls, @ Seoul National University

- Developed machine learning-based indoor air temperature and electricity prediction models for an existing office building.

Development of Real-time Diagnosis Technology of Home Energy Usage and Smart & Autonomous Control/Management System Jan. 2020 – Feb. 2022

Supported by Korean Energy Technology Evaluation and Planning (KETEP), @ Seoul National University

- Explored machine learning-based indoor air and setpoint temperature prediction models for existing residential buildings.

HONORS AND AWARDS

Graduate Student Research and Presentation Travel Award Aug. 2023
Graduate and Professional Studies, Texas A&M University

Departmental Graduate Student Travel Award May/Aug. 2023
J. Mike Walker '66 Department of Mechanical Engineering, Texas A&M University (2 times)

An AI for IOT Information (AI3) Prize Competition Feb. 2023
Phase 1 winner, Won \$10,000 as a team (the only student team)
<https://www.us-ignite.org/program/startup-support/nist-iot-competition/>

Emil Buehler Aerodynamic Analog Fellowship Aug. 14, 2022
J. Mike Walker '66 Department of Mechanical Engineering, Texas A&M University

Outstanding Paper Award (co-author) Apr. 29, 2022
The 2022 Spring Annual Conference of the Architectural Institute of Korea

Poster Session Award Winner (runner-up) Dec. 14, 2020
The 2020 Winter Simulation Conference

Organization Scholarship Sep. 2020 – Feb. 2022
Full tuition (3 semesters), The Education and Research Foundation of Seoul National University

Eminence Scholarship Mar. 2016 – Feb. 2020
Full tuition (4 semesters), Seoul National University

Certificate of Appreciation May 3, 2018
2018 Key Resolve R.O.K & U.S. Joint Exercise (Took charge of translation)

Organization Scholarship
Full tuition, Moon-Ju Scholarship Foundation

Sep. 2015 – Feb. 2016

Merit-based Scholarship
Partial tuition (40%), Seoul National University

Mar. 2015 – Aug. 2015

JOURNAL PAPERS

Choi, Y., Lu, X., Feng, F., and O'Neill, Z. (2024). Large-scale optimization and energy performance analysis for dedicated outdoor air system: Simulation results from ASHRAE RP-1865. Submitted to *Science and Technology for the Built Environment* (Under review)

Choi, Y., Lu, X., O'Neill, Z., Feng, F., and Yang, T. (2023). Optimization-informed rule extraction for HVAC system: A case study of dedicated outdoor air system control in a mixed-humid climate zone. *Energy and Buildings*, 113295.

PEER-REVIEWED CONFERENCE PROCEEDINGS

Choi, Y., Lu, X., Feng, F., and O'Neill, Z., 2024, Large-scale Energy Performance Analysis for Optimization-informed Rule Extraction for Dedicated Outdoor Air System, *The 1st International Workshop on Building and Simulation (BAS 2024)*, Syracuse, NY, USA, May 13-14, 2024 (Abstract Accepted)

Choi, Y., Lu, X., Feng, F., and O'Neill, Z. (2024), Energy Saving Potential Analysis for Primary Schools with Optimal Dedicated Outdoor Air System Control in Different Climate Zones. *2024 ASHRAE Winter Conference*, Jan. 20-24, Chicago, USA.

Choi, Y., Lu, X., O'Neill, Z., and Feng, F. (2023), Optimal Supply Air Temperature Control for Dedicated Outdoor Air System Under Varying Climate Zones. *Building Simulation Conference 2023*, Shanghai, China.

Choi, Y., O'Neill, Z., and Yang, S. (2023), Potentials of Direct Air Capture (DAC) of CO₂ in a Dedicated Outside Air System (DOAS). *ASHRAE Annual Conference 2023*, Jun. 24-28, Tampa, USA.

Choi, Y., Lu, X., O'Neill, Z., and Pang, Z. (2023), Modeling and Simulation of Dedicated Outdoor Air System (DOAS) with a Passive Desiccant Wheel: A Case Study using EnergyPlus. *ASHRAE Annual Conference 2023*, Jun. 24-28, Tampa, USA.

Choi, Y., Shin, H.S., Cho, S., Ko, Y.D., and Park, C.S. (2020), Predictive Uncertainty of Residential Building Energy Model, *2020 Winter Simulation Conference*, Dec. 14-18, Orlando, USA (Virtual Conference). (**Best Poster Award**)

Cho S., Shin. H.S., **Choi, Y.**, Ko, Y.D. and Park, C.S. (2020), Occupant-adaptive indoor environmental controller using DQN, *2020 Winter Simulation Conference*, Dec. 14-18, Orlando, USA (Virtual Conference).

TALKS

O'Neill, Z., Yang, Z., and **Choi, Y.**. A Collage of ASHRAE Research Projects at Building Energy & HVAC Research Group at the Texas A&M University. *Austin ASHRAE 2024 Expo*, Norris Conference Center - Austin, Austin, TX, Apr. 4, 2024.

TEACHING & INSTRUCTION

- Teaching Assistant**, Seoul National University Sep. 2020 – Feb. 2021
- 400.418 Creative Engineering Design: Assisted teaching Creative Engineering Design, an undergraduate course covering the following topics: Integration of architecture and Internet of Things (IoT), Basics of Arduino, and environmental sensors.
- Undergraduate Peer Tutor (Work Scholarship)**, Seoul National University Sep. 2019 – Feb. 2020
- Selected as an undergraduate peer tutor based on academic performance. Taught a junior from the Architecture and Architectural Engineering department about core courses.
- Republic of Korea Navy Peer Counselor**, R.O.K. Navy Jan. 2018 – Jun. 2018
- Selected as a peer counselor to conduct counseling for soldiers in the military.
- Seoul National University Dream Consultants**, Seoul National University Jun. 2014 – Aug. 2014
- Organized a mentoring program for high school students in underprivileged areas as a mentor.

TECHNICAL SKILLS

Building Simulation: EnergyPlus, GLHEPro, CC® WinAM, THERM, WINDOW, and Relux

Programming: Python, Visual Basic, Arduino

Frameworks: Tensorflow, Keras, NumPy, Pandas, etc.

OTHER EXPERIENCE

- Hyundai Engineering and Construction** Dec. 2018 – Feb. 2019
- Worksite manager (undergraduate internship)
- Republic of Korea Navy** Aug. 2016 – Jul. 2018
- Construction engineer & translator (mandatory military service)
- Seoul National University Buddy Assistants (SNU Buddy)** Mar. 2015 – Dec. 2015
- Organized and participated in socializing programs for foreign exchange students.

PROFESSIONAL MEMBERSHIP

- The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)**
- Student Member (Jan. 2023 – Present)
 - Texas A&M Student Chapter Member (Sep. 2023 – Present)
- Korean-American Scientists and Engineers Association (KSEA)**
- Student Member (Feb. 2024 – Present)

REFERENCES

Available upon request.