

# YOUNGSIK CHOI

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## EDUCATION

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<b>PhD</b>	<b>Texas A&amp;M University</b> , Mechanical Engineering <b>Advisor:</b> Prof. Zheng O'Neill <b>Committee:</b> Prof. David Claridge, PhD; Prof. Michael Pate, PhD; Prof. Charles Culp, PhD <b>GPA:</b> 3.80/4.0	May 2022 – Present
<b>MS</b>	<b>Seoul National University</b> , Architecture and Architectural Engineering <b>Advisor:</b> Prof. Cheol-Soo Park <b>Committee:</b> Prof. Myoung-Souk Yeo, PhD; Sun Sook Kim, PhD <b>Thesis:</b> <i>'Stochastic Setpoint Temperature Learning for Occupant Behavior-based Control'</i> <b>GPA:</b> 3.97/4.3	Mar. 2020 – Feb. 2022
<b>BS</b>	<b>Seoul National University</b> , Architectural Engineering Graduated with honors <i>Cum Laude</i> <b>GPA:</b> 3.88/4.3 2-year absence to fulfill mandatory military service (Aug. 2016 – Jul. 2018)	Mar. 2014 – Feb. 2020
	<b>Peking University</b> , College of Engineering Exchange student (Summer session offered in English)	Jul. 2016

## FIELDS OF INTEREST

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Building energy modeling and simulation, HVAC optimal control, carbon emission reduction, machine learning.

## RESEARCH EXPERIENCE

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<b>PhD Intern</b> , Pacific Northwest National Laboratory	Jul. 2023 – Aug. 2023
<b>Graduate Research Assistant</b> , Texas A&M University	May 2022 – Present
<b>Graduate Research Assistant</b> , Seoul National University	Mar. 2020 – Feb. 2022

## RESEARCH PROJECTS

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<b>Smart Meter Data Analysis</b> @ Texas A&M University	Jun. 2024 – Present
<ul style="list-style-type: none"><li>Exploring smart meter electricity data for 1,931,349 residential buildings in Harris County, Texas.</li><li>Quantifying the performance in terms of energy flexibility and resilience KPIs.</li></ul>	
<b>High-performance Whole Building Design 3D-printed Carbon-Absorbing Funicular Structures</b> Sponsor: DOE ARPA-E HESTIA, @ Texas A&M University	Jan. 2023 – Present.

- Developing EnergyPlus model for radiant system for buildings with carbon-absorbing funicular structures.
- Investigating operational carbon emission reduction calculation.

#### **Optimizing Supply Air Temperature Control for Dedicated Outdoor Air Systems** May 2022 – Present

Sponsor: ASHRAE 1865, @ Texas A&M University

- Developed EnergyPlus model for DOAS with heat pumps, fan coils, and chilled beams.
- Developed optimization-informed rule extraction framework for DOAS supply air temperature control.
- Conducted 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

Sponsor: 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

Sponsor: 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**

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#### **Brenda & Jerry Gray '62 Fellowship** Aug. 2024

J. Mike Walker '66 Department of Mechanical Engineering, Texas A&M University

#### **ASHRAE Graduate Grant-In-Aid** May 2024

American Society of Heating, Refrigerating and Air-Conditioning Engineers

Selected and awarded as one of 20 graduate students specializing in ASHRAE-related technologies.

#### **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. 2022

J. Mike Walker '66 Department of Mechanical Engineering, Texas A&M University

#### **Outstanding Paper Award (co-author)** Apr. 2022

The 2022 Spring Annual Conference of the Architectural Institute of Korea

<b>Poster Session Award Winner (runner-up)</b> The 2020 Winter Simulation Conference	Dec. 2020
<b>Organization Scholarship</b> Full tuition (3 semesters), The Education and Research Foundation of Seoul National University	Sep. 2020 – Feb. 2022
<b>Brain Korea 21 Scholarship</b> Monthly stipend, The National Research Foundation of Korea	Sep. 2020
<b>Eminence Scholarship</b> Full tuition (4 semesters), Seoul National University	Mar. 2016 – Feb. 2020
<b>Certificate of Appreciation</b> 2018 Key Resolve R.O.K & U.S. Joint Exercise Took charge of interpreting at the R.O.K & U.S. combined task force	May 2018
<b>Organization Scholarship</b> Full tuition, Moon-Ju Scholarship Foundation	Sep. 2015 – Feb. 2016
<b>Merit-based Scholarship</b> Partial tuition (40%), Seoul National University	Mar. 2015 – Aug. 2015

## JOURNAL PAPERS

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**Choi, Y.,** Lu, X., Feng, F., and O'Neill, Z. (2024). Large-scale energy cost optimization and performance analysis for dedicated outdoor air system: simulation results from ASHRAE RP-1865. *Science and Technology for the Built Environment*, 1-19.

**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

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**Choi, Y.** and O'Neill, Z., 2024, Model predictive control of radiant heating system under varying thermal mass scenarios in mixed-humid climate zone, *2024 Texas A&M Conference on Energy*, College Station, TX, USA, Sep 11-13, 2024 (Presentation only)

**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 (Poster only)

**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 CO<sub>2</sub> 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

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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 & INSTRUCTIONS

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**Undergraduate Mentor**, Texas A&M University Oct. 2023 – Feb. 2024

- Provided mentorship to an undergraduate team participating in ASHRAE 2024 Design Competition.

**Graduate 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

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

**Programming:** Python, Visual Basic, Arduino

**Statistical Software:** JMP

## OTHER EXPERIENCE

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**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 (as a team leader) and participated in socializing programs for foreign exchange students.

**PROFESSIONAL MEMBERSHIP**

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**The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)**

- Student Member (Jan. 2023 – Present)
- Corresponding Member Technical Committee (TC) 7.6 (Building Energy Performance), Provisional Corresponding Member TC 7.5 (Smart Building Systems) (Feb. 2023 – Present)
- Texas A&M Student Chapter Member (Sep. 2023 – Present)

**REFERENCES**

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Available upon request.