

# JINYOUNG KO

📍 604-1, Building No.203, Wangsimni-ro 222, Seongdong-gu, Seoul, 04763, South Korea

✉ hamonick224@hanyang.ac.kr 🌐 website: jinyoungko96.github.io

## EDUCATION

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### Hanyang University

*M.S. in Architectural Engineering - Architectural Environment System*

Sept. 2019 - Aug. 2021

Seoul, South Korea

- Thesis: Power generation performance of novel photovoltaic system integrated with thermoelectric generator and phase change material for building application *Best Graduate Thesis Award*
- Advisor: Professor Jae-Weon Jeong; GPA: 4.0/4.0

### Hanyang University

*B.S. in Architectural Engineering*

Mar. 2014 - Feb. 2017

Seoul, South Korea

- *Summa cum laude*, Class rank: 1/44, GPA: 3.84/4.0 *Early Graduation in 6 semesters & Best Thesis Award*

## JOURNAL PAPERS

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1. **J. Ko**, J.-W. Jeong\* (2021). "Melting temperature-dependent power generation performance of thermoelectric generator assisted energy harvesting block." *In preparation*.
2. **J. Ko**, J.-W. Jeong\* (2021). "Annual performance evaluation of thermoelectric generator-assisted building-integrated photovoltaic system with phase change material." *Renewable and Sustainable Energy Reviews*, Vol. 145, 111085. <https://doi.org/10.1016/j.rser.2021.111085>
3. **J. Ko**, J. Park, J.-W. Jeong\* (2021). "Energy saving potential of a model-predicted frost prevention method for energy recovery ventilators." *Applied Thermal Engineering*, Vol. 185, 116450. <https://doi.org/10.1016/j.applthermaleng.2020.116450>
4. J.-H. Lee, **J.-Y. Ko**, J.-W. Jeong\* (2021). "Design of heat pump-driven liquid desiccant air conditioning systems for residential building." *Applied Thermal Engineering*, Vol. 183, 116207. <https://doi.org/10.1016/j.applthermaleng.2020.116207>

## CONFERENCE PROCEEDINGS

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### International

1. **J. Ko**, S.-Y. Cheon, J.-W. Jeong\* (2021). "Phase-change material design for thermoelectric generator assisted building integrated photovoltaic." *2021 ASHRAE annual conference*.
2. S.-Y. Cheon, H.-J. Cho, **J. Ko**, J.-W. Jeong\* (2021). "Empirical Analysis of Dehumidification Performance of a Hollow Fiber Membrane Dehumidifier." *Heat Pump Conference 2020*.
3. S.-Y. Cheon, H. Lim, H.-W. Dong, **J. Ko**, J.-W. Jeong\* (2021). "Applicability of vacuum-based membrane dehumidifier in dedicated outdoor air system." *ROOMVENT 2020*.
4. **J. Ko**, H. Lim, J.-H. Lee, J.-W. Jeong\* (2020). "Development of frost threshold temperature model in energy recovery ventilator regarding indoor and outdoor air conditions." *INDOOR AIR 2020*.

### Domestic

1. **J. Ko**, J.-W. Jeong\* (2021). "Applicability of a thermoelectric heat-pump for pre-heating in winter operation of an energy exchange ventilator." Spring Conference of the *Korea Institute of Ecological Architectural Environment*. *Best Presentation Award* 🏆
2. **J. Ko**, S.-Y. Cheon, Y.-K. Kang, J.-W. Jeong\* (2020). "Generation performance of thermoelectric generator and phase change material assisted building integrated photovoltaic module." Fall Conference of *Korean Institute of Architectural Sustainable Environment and Building System*. *Best Presentation Award* 🏆
3. **J. Ko**, S.-Y. Cheon, J.-H. Lee, J.-W. Jeong\* (2020). "Energy savings of a liquid desiccant-assisted dedicated outdoor air system." Summer Conference of the *Society of Air-Conditioning and Refrigerating Engineers of Korea*. *Outstanding Paper Award* 🏆
4. **J. Ko**, J.-W. Jeong\* (2019). "Development of pre-heat temperature prediction model for condensation prevention regarding effectiveness of energy recovery ventilator." Fall Conference of the *Korea Institute of Ecological Architectural Environment*. *Best Presentation Award* 🏆

## RESEARCH EXPERIENCE

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### Building Mechanical and Environmental Systems Laboratory

Post-Master Researcher; Advisor: Professor Jae-Weon Jeong

Aug. 2021 - Present

Seoul, South Korea

- Developed energy harvesting block to produce electricity from waste heat for building envelop.
  - Modeled 3D-printed energy harvesting block based on Fusion 360.
  - Currently, access generation performance through experiments based on sol-air temperature profile.

### Building Mechanical and Environmental Systems Laboratory

Graduate Research Assistant; Advisor: Professor Jae-Weon Jeong

Sept. 2019 - Aug. 2021

Seoul, South Korea

- Established novel concept of building-integrated photovoltaic - thermoelectric generator - phase change material (BIPV-TEG-PCM) system to generate additional electricity from solar thermal energy.
  - Designed energy simulation with a numerical analysis on transient heat transfer through Matlab.
  - Investigated power generation performance and seasonal characteristics of the proposed system.
  - Published journal paper on Renewable and Sustainable Energy Reviews.
- Performed building energy simulation on heat-pump driven liquid desiccant HVAC system.
  - Assisted with energy analysis of heat pump-driven liquid desiccant (HPLD) air-conditioning system.
  - Estimated energy saving potential of HPLD-assisted dedicated outdoor air system via energy simulation.
  - Published journal paper on Applied Thermal Engineering.
- Presented energy saving approach for outdoor air pre-heating in energy recovery ventilator.
  - Developed variable temperature model for pre-heating via psychrometric equations.
  - Validated proposed model based on design and analysis of computer experiments (DACE).
  - Published journal paper on Applied Thermal Engineering.
- Invented innovative HVAC systems based on thermoelectric cooling and heating.
  - Created a concept of thermoelectric heat-pump assisted outdoor air pre-heater in a Patent Application.
  - Invented CCHP-assisted dedicated outdoor air system in a Patent Application.
  - Reported an invention of cooling tower-integrated thermoelectric cooling system in a Patent Application.

### Architectural Acoustics Lab (AAL)

Undergraduate Intern; Advisor: Professor Jin Yong Jeon

Apr. 2016 - Jun. 2016

Seoul, South Korea

- Implemented acoustic visualization of floor impact noise in apartments.
  - Conducted in-situ experiments and measurements on floor impact noise according to receiving positions.
  - Preprocessed measured signal data for acoustic visualization via Adobe Audition.

## PATENTS

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1. J.-W. Jeong, **J. Ko** (2021). "Ourdoor air preheater based on thermoelectric heat-pump." In preparation.
2. J.-W. Jeong, H. Lim, **J. Ko** (2021). "Dedicated outdoor air system: liquid desiccant-assisted dedicated outdoor air system integrated with thermoelectric modules and CCHP." Application No.10-2021-0081446, South Korea.
3. J.-W. Jeong, S.-Y. Cheon, **J. Ko** (2021). "Apparatus for controlling cooling water temperature of cooling tower: high performance thermoelectric cooling system integrated with cooling tower." Application No.10-2021-0041683, South Korea.

## SKILLS

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Programming Languages	Python, Matlab, HTML
Building / CFD Simulation Tools	TRNSYS, ANSYS Fluent
Engineering Software	Design-Expert, Engineering Equation Solver (EES)
Architecture / Product Design Tools	Autodesk Fusion 360, Autodesk AutoCAD, Ultimaker Cura, SketchUp, Rhinoceros/Grasshopper
Documentation Software	L <sup>A</sup> T <sub>E</sub> X, Mendeley, Microsoft Office

## AWARDS AND HONORS

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### Awards

Best Graduate Thesis Award, <i>Hanyang University</i>	Aug. 2021
Best Paper Presentation Award, <i>Spring Conference of KIEAE</i>	May 2021
Best Paper Presentation Award, <i>Fall Conference of KIASSEBS</i>	Nov. 2020
Outstanding Paper Award, <i>Summer Conference of SAREK</i>	Jun. 2020
Best Paper Presentation Award, <i>Fall Conference of KIEAE</i>	Nov. 2019
Graduation Excellence Award - <i>Summa cum laude, Hanyang University</i>	Feb. 2017
Best Undergraduate Thesis Award, <i>Hanyang University</i>	Nov. 2016
Academic Achievement Excellence Award, <i>Hanyang University</i>	Apr. 2016
Student Achievement Award of 77 <sup>th</sup> Foundation Day, <i>Hanyang University</i>	May 2016
Grand prize, <i>Digital Virtual Village Modeling Competition of KIBIM</i>	Nov. 2015
Academic Achievement Excellence Award, <i>Hanyang University</i>	Apr. 2015

### Scholarship

National Scholarship for Science and Engineering, <i>Korean Government</i>	Mar. 2016 - Feb. 2017
Merit-based Scholarship, <i>Hanyang University</i>	Sept. 2014 - Feb. 2016

## TUTORING EXPERIENCE

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<b>Personal Tutoring</b> <i>Mathematics Teacher</i> · Educated high school mathematics, especially in Calculus, for a freshman in high school.	Mar. 2017 - Aug. 2017 <i>Seoul, South Korea</i>
<b>”Jeonnong” Cram School</b> <i>Mathematics Teacher</i> · Taught middle school mathematics from Equation Solving to Geometry for middle school students.	Oct. 2016 - Dec. 2016 <i>Seoul, South Korea</i>

## LEADERSHIP EXPERIENCE

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<b>School Band - SOKNA at Hanyang University</b> <i>President</i> · Managed band club of more than 30 people and performed four times a year.	Jan. 2015 - Dec. 2015 <i>Seoul, South Korea</i>
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## MILITARY SERVICE

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<b>Vision Training Center</b> <i>Social Service Agent</i> · Served at a homeless facility as an alternative to the compulsory military service of Korea.	Oct. 2017 - Sept. 2019 <i>Seoul, South Korea</i>
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