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Date: 2022.08

# Yun Kyu Yi

Associate Professor, School of Architecture, University of Illinois at Urbana-Champaign

## **EDUCATION**

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| 2008 | Ph.D., Architecture,<br>School of Design, University of Pennsylvania.<br>Dissertation: Integration of Computational Fluid Dynamics (CFD) and Energy Simulation (ES)<br>for Optimal Energy Form Generation |
| 2005 | M.S., Architecture,<br>School of Design, University of Pennsylvania.  |
| 2001 | M.S., Architectural Engineering,<br>Department of Architectural Engineering, Yonsei University, Korea (South)   |
| 1995 | B.S., Architectural Engineering<br>Department of Architectural Engineering, Hong-ik University. Korea (South)   |

## **TEACHING EXPERIENCE**

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| 2022 – pres | Associate Professor<br>School of Architecture, University of Illinois at Urbana-Champaign       |
| 2016 – 2022 | Assistant Professor<br>School of Architecture, University of Illinois at Urbana-Champaign       |
| 2009 – 2016 | Assistant Professor<br>Department of Architecture, School of Design, University of Pennsylvania |
| 2007 – 2009 | Lecturer<br>Department of Architecture, School of Design, University of Pennsylvania            |
| 2003 – 2006 | Teaching Assistant<br>Department of Architecture, School of Design, University of Pennsylvania  |

## **OTHER PROFESSIONAL EMPLOYMENT (SINCE 2016)**

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| 2017-pres | Founder and Lead Investigator, Responsive Architecture Lab (RAL), School of Architecture,<br>University of Illinois, Champaign, Illinois |
| 2017-pres | Founder and Lead Investigator, Responsive Architecture Lab (RAL), School of Architecture,<br>University of Illinois, Champaign, Illinois |
| 2016-pres | Founder and Investigator, Envitect. LLC, CheongJu, Korea (South)   |

## **HONORS, RECOGNITIONS, AND OUTSTANDING ACHIEVEMENTS (SINCE 2016)**

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- 2019 Stuart L. and Nancy J. Levenick Sustainability Teaching Fellow, 2019., The Institute for Sustainability, Energy, and Environment (iSEE), UIUC, 2019, \$2,000
- 2019 NSF-funded Workshop on Architectural Faculty in Environmental Sustainability (WAFES) Travel Fellowship, NSF, 2019, \$1,000.
- 2017 Paper "Programmable Kiri-Kirigami Metamaterials" highlighted on Advanced Science News, Wiley. (<http://www.advancedsciencenews.com/adaptive-architecture-energy-saving-buildings/>)
- 2016-2018 Design Research Initiative Fellowship, FAA, UIUC, 2016-2018, \$50,000
- 2016 2015 Sejong Outstanding Scholarly Book Awards, PIPA (Korea Publication Industry Promotion Agency), Ministry of Culture, Sports, and Tourism, Seoul, Korea (South); translated book entitled Design and Construction of High-Performance Homes selected for the award.

### **INVITED LECTURES AND (REVIEW) PANELS (SINCE 2016)**

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- 2022 Reviewer, Graduate Architecture Degree Project Technical Workshops, Sam Fox School of Design & Visual Arts, Washington University, St. Louis, USA, March 7-10 2022.
2020. Scientific Committee, 5th Annual International Graduate Student Symposium, College of Architecture, Illinois Institute of Technology, Chicago, USA, November 13-14 2020.
2019. Session Chair, 16th International IBPSA Conference, Rome, Italy, September 2-4 2019.
2019. "Building Simulation and Its Implementation," Illinois Solar Decathlon Guest Lecture, University of Illinois at Urbana-Champaign, Champaign (Nov 7th)
2019. Session Chair, 16th International IBPSA Conference, Rome, Italy, September 2-4 2019.
2018. "Building Simulation Beyond Instrumentality," National Organization of Minority Architecture Students, University of Illinois at Urbana-Champaign, Champaign (Feb. 10th)
2017. Critic, Design studio, School of Architecture, Sungkyunkwan University, Korea. 2017. June.
2017. "Real-Meter Data," Campus as Lab Workshop, Institute for Sustainability, Energy, and Environment, University of Illinois at Urbana-Champaign, Champaign (September 29)
2017. Critic, Design studio, School of Architecture, Sungkyunkwan University, Korea. June.

### **GRANTS RECEIVED (SINCE 2016)**

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- 2019 Stark, Timothy D., Kriven, Waltraud M., Taylor, Mark S. and Yi, Y.K., Institute's Living Lab Research Seed Funding, UIUC, \$30,000.
- 2019 Yi, Y.K., Campus Research Board Scholar's Travel Fund, UIUC, 2019, \$1,000
- 2019 Yi, Y.K., and Kang, B., Institute for Sustainability, Energy, and Environment (iSEE)'s Living Lab Research Seed Funding, UIUC, 2019, \$30,000.
- 2018 Yi, Y.K., Campus IT Grant, UIUC, \$5,000
- 2018 Yi, Y.K., Campus Research Board Fund, UIUC, \$15,291
- 2014 Yi, Y.K., Provost's Undergraduate Research Mentoring Grant, University of Pennsylvania, \$5,500
- 2012 Yi, Y.K., Provost's Undergraduate Research Mentoring Grant, University of Pennsylvania, \$5,500

### **PATENTS, TRADEMARK, AND SOFTWARE (SINCE 2016)**

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- 2020 Liu, Z. and Yi, Y. K., "TIE (Tensegrity Integration Element) for Rhino," a tool for Rhino CAD, 2020 (<https://publish.illinois.edu/tie4rhino/>).
- 2018 United States Patent and Trademark Office ("USPTO") issued a Notice of Allowance for QuVue as a trademark under the University of Illinois Board of Trustees.

2016 Yi, Y. K. and Kim H. "Three-Dimensional Open View Ratio Calculation and Analyzing Method." Patent Number 101670793. October 25, 2016. (Korea)

## **PUBLICATIONS (SINCE 2016)**

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### **Refereed Journals**

- 2022 Yi, Y.K., et.al., "Integrating Parametric Design, Computational Fluid Dynamics (CFD), and Machine Learning to Maximize the Potential of Electricity Generation from the Pavilion," Technology | Architecture + Design (TAD), ACSA, accepted.
- 2021 ShanShan Wang, Yun Kyu Yi, NianXiong Liu, "Multi-objective optimization (MOO) for high-rise residential buildings' layout centered on daylight, visual, and outdoor thermal metrics in China," Building and Environment, 2021,108263, ISSN 0360-1323, <https://doi.org/10.1016/j.buildenv.2021.108263>
- 2020 Wang, B., Yi, Y. K., "Developing an Adapted UTCI (Universal Thermal Climate Index) for the Elderly Population in China's Severe Cold Climate Region," Sustainable Cities and Society. Accepted. <https://doi.org/10.1016/j.scs.2021.102813>.
- 2020 Yi, Y. K., Tariq, A., Park, J., and Barakat, D., "Multi-Objective Optimization (MOO) of a Skylight Roof System for Structure Integrity, Daylight, and Material Cost," Journal of Building Engineering. Volume 34, February 2021, 102056. <https://doi.org/10.1016/j.jobe.2020.102056>.
- 2020 Yi, Y. K., Zhang, Y., and Myung, J., "House style recognition using deep convolutional neural network." Automation in Construction. 118. Oct. 2020, 103307. <https://doi.org/10.1016/j.autcon.2020.103307>.
- 2020 Yi, Y. K. and Kang, B., "Integrating a wind turbine into a parking pavilion for generating electricity," Journal of Building Engineering. 32. Nov 2020, 101471. <https://doi.org/10.1016/j.jobe.2020.101471>.
- 2020 Qiu, Changyu, Y. K. Yi, M. Wang, H. Yanga, "Coupling an artificial neuron network daylighting model and building energy simulation for vacuum photovoltaic glazing," Applied Energy Volume 263, April 2020, 114624. <https://doi.org/10.1016/j.apenergy.2020.114624>.
- 2019 Yi, Y. K., "Building facade multi-objective optimization for daylight and aesthetical Perception," Building and Environment, Volume 156, April 2019, Page 178-190.
- 2019 Shen, P., Braham, W., Yi, Y. K., and Eaton, E., "Rapid multi-objective optimization with multi-year future weather condition and decision-making support for building retrofit," Energy, Volume 172, 1 April 2019, Pages 892-912.
- 2019 Kim, H. and Yi, Y. K., " QuVue Implementation for Decisions Related to High-rise Residential Building Layouts," Building and Environment, Volume 148, 15 January 2019, Pages 116-127.
- 2019 Oh, Sung-Hoon, Yi, Y. K., Lee Kang-Hee, Yi, Yong-Kyu. "Jeju's alley space as a Crime Prevention Environment Research of 'Olle' - The center of the Sinsan-Muru area in Jeju." Journal of Community Safety and security by environmental design, 2019, vol.10, no.2, pp. 171-198, <http://dx.doi.org/10.26470/JCSSED.2019.10.2.171>
- 2019 Shen, P., Braham, W., and Yi, Y. K., "The feasibility and importance of considering climate change impacts in building retrofit analysis." Applied Energy, Volume 223-234, 1 January 2019, Pages 254-270.
- 2019 Yi, Y. K., Ghoreishi, A., and Barakat, D., "Auxetic Structures and Advanced Daylight Control Systems," Journal of Façade Design & Engineering (JFDE) , Vol 7 No 1, January 2019, page 63-74.

- 2018 Yi, Yong Kyu, Yi, Yun Kyu, and Jing, L-Y, "Discussion on Sustaining "Olle" without Losing Integrity of Local Identity - Focused on downtown area called Mu-geun-sung at Jeju City-" Journal of the Korean Institute of Rural Architecture, Vol. 20, (Aug. 2018), Issue 3, pp 19-26. (Korean)
- 2018 Shen, P., Braham, W., and Yi, Y. K., "Development of a lightweight building simulation tool using simplified zone thermal coupling for fast parametric study." Applied Energy, Volume 223, (August 2018), pp 188-214.
- 2018 Yi, Y. K.K, Yin, J., and Tang, Y., "Developing an advanced daylight model for building energy tool to simulate dynamic shading device," Solar Energy, vol 163 (2018): pp 140-149
- 2017 Yi, Y. K., and Kim, H., "Universal Visible Sky Factor: A method for calculating the three-dimensional visible sky ratio," Building and Environment, vol 123 (Oct): pp 390-403
- 2017 Jihun Kim, Yun Kyu Yi, Ali Malkawi, "Topography integration to wind downscaling," Building and Environment 115 (2017) pp 306-315
- 2016 Y. Tang, G. Lin, S. Yang, Y. K. Yi, R. D. Kamien, J. Yin, "Programmable Kiri-Kirigami Metamaterials," Adv. Mater., 27 December 2016, 1604262.
- 2016 Yi, Yun Kyu. "Dynamic Coupling between a Kriging-Based Daylight Model and Building Energy Models," Energy and Buildings vol. 128, NO 15 (September 2016): pp 798-808.
- 2016 Yi, Yun Kyu. "Adaptation of Kriging in Daylight Modeling for Energy Simulation," Energy and Buildings vol. 111, No 1 (January 2016): pp 479-496.
2016. Yi, Y. K., "Adaptation of Kriging in Daylight Modeling for Energy Simulation," Energy and Buildings vol. 111, No. 1 (January 2016): pp 479-496.

#### Refereed Conferences

- 2022 Myung, Junyoung, and Yi, Y. K., "Architectural Survey for the National Register Using Computer Vision," Society of Architectural Historians (SAH) 2022 Annual International Conference, in Pittsburg, PA.
- 2021 Yi, Y. K., Jang, K., Wei, A. C., Kang, B., and Anis, M., "Integrating Parametric Design and Computational Fluid Dynamics (CFD) to Maximize Electricity Generation from Pavilion," ARCC (Architectural Research Centers Consortium) 2021 International Conference, in Virtual Tucson, AZ., accepted.
- 2021 Yi, Y. K., Anis, M., and Jang, K., "Development of Window Apertures to Improve Natural Ventilation in Educational Buildings," ARCC (Architectural Research Centers Consortium) 2021 International Conference, in Virtual Tucson, AZ., accepted.
- 2020 Shishegar, N., Boubekri, M., Rogers, W., and Stine-Morrow, E., Yi, Y. (2020). Therapeutic Lighting Design to Decrease Depression in Older Adults, 2020 ACSA Annual Conference, San Diego, CA. March 12-14, 2020.
- 2019 Yi, Y. K., and Jang, K., "Multi-Objective Optimization on Daylight Control System's Qualitative and Quantitative Performance," In Proceedings of the 16th International IBPSA Conference, Rome, Italy, September 2-4 2019.
- 2019 Ghoreishi, A., Yi, Y. K., and Barakat, D., "Auxetic Structures and Advanced Daylight Control Systems," PowerSkin Conference 2019, Technische Universität München, Munich, January 17, 2019.
- 2018 Yi, Y. K., "Building Simulation Tools and High Performance Design," ARCC EAAE 2018 Conference in Philadelphia, 2018
- 2017 Yi, Y. K., "Performance-Based 3D Interior Space Layout Optimization," in Passive Low Energy Architecture (PLEA) - Design to Thrive, Edinburgh, UK (July 3-5 2017)

## Interview

2017 Interview published in the book *Convergence: The Redesign of Design* by Randy Deutsch (AD, 2017)

## Consulting Reports

2022. Yi, Y.K., W. Braham, R. Srinivasan, P. Shen, "Building Modelling, System Evaluation, and Performance Analysis: Ecobee DYD data set," Daikin Open Innovation Lab, Silicon Valley, CA., \$100,000.

2021. Yi, Y.K., W. Braham, R. Srinivasan, P. Shen, "White box, Black box, Gray box modelling of building energy use," Daikin Open Innovation Lab, Silicon Valley, CA., \$20,000.

2020. Yi, Y. K., Sanders, J., and Tariq, A., "New I-ACT Master Plan Animation," Rantoul, IL. \$15,000.

2020. Yi, Y. K., ESTUDIO DE ARQUITECTURA, Archbody architects, "Museum of Urbanism and Architecture Competition," Korea.

2020. Yi, Y, K., "Moonsan Youth Center Competition CFD study," Paju, Korea.

2020. Yi, Y, K., "Yeosu Safety Education and Training Center Competition CFD and daylight study," Paju, Korea.

2019. Yi, Y. K., "Master Plan for Illinois Automated and Connected Track (I-ACT)," Illinois Center for Transportation, University of Illinois at Urbana-Champaign. \$6,412.

2019. Yi, Y, K., "BanDaBee Competition Outdoor CFD study," Okchen, Korea.

2019. Yi, Y, K., "Dallsung Education and Cultural Center Competition Outdoor CFD study," Daegu, Korea.

2017. Yi, Y. K., "TS Building Renovation CFD study", Seoul, Korea.

2017. Yi, Y. K., "A Study of the Development of a Prototype of the BIM based Building Envelope's Design System by Building's Energy-Saving Design Element," Ulsan, Korea,

## Creative Works (Competition)

2020 Yi, Y. K., ESTUDIO DE ARQUITECTURA, and Archbody architects, "Museum of Urbanism and Architecture Competition," Korea, 2020.

## **SUMMARY OF INSTRUCTION (SINCE 2016)**

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### List of Course Taught

**ARCH 573: High Performance + Responsive Architecture**

**ARCH 576: Simulation and Design**

**ARCH 576: Performance and Design: Parametric Integration**

**ARCH 475: Arch Design & Development (Capstone Studio)**

**ARCH 274: Representation (2020 Spring)**

### PhD in Architecture Committee Member

IP = in progress

^ Denotes service as Chair or co-Chair of Committee

2017-pres ^ Keunhyuk Jang, "Dynamic coupling of CFD and Whole building energy simulation," University of Illinois at Urbana-Champaign, IP.

2020-pres ^ Manal Anis, "Responsive biomaterial and design integration," University of Illinois at Urbana-Champaign, IP.

2021-pres ^ You-Jeoung Kim, "Greybox energy modeling for human behavior," University of Illinois at Urbana-Champaign, IP.

## **SERVICE (SINCE 2016)**

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### **Service to Disciplinary and Professional Societies or Associations**

- 2020 Scientific Committee, 5th Annual International Graduate Student Symposium, College of Architecture, Illinois Institute of Technology, Chicago, November 13-14 2020.
- 2019 Reviewer, IEEE (Institute of Electrical and Electronics Engineers) Access.
- 2019-pres Reviewer, Architectural Science Review, Taylor & Francis.
- 2019-pres Reviewer, Applied Energy Journal. Elsevier.
- 2019-pres Reviewer, Journal of Building Engineering, Elsevier.
- 2018 Reviewer, TAD, Taylor & Francis
- 2018 Reviewer, Building Simulation 2019, the Sixteen International Conference of IBPSA, Roma, Italy.
- 2016 Reviewer, Building Simulation 2017, the Fifteenth International Conference of IBPSA, San Francisco, CA, USA.
- 2016 Committee, IAQVEC 2016, the 9th International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings, Seoul, Korea.
- 2016-pres External Affiliated Faculty, Center for Environmental Building & Design, University of Pennsylvania.