RAVI SRINIVASAN PhD, CEM, LEED AP, GGP, USIBD
Associate Dean for Research and Strategic Initiatives
Tenured Full Professor, Construction Management
Director, Urban Building Energy, Sensing, Controls, Big Data Analysis, and Viz. (UrbSys) Lab
College of Design, Construction and Planning
University of Florida
Gainesville, Florida 32611, United States of America

Other Affiliations

At University Institute/ Center – Affiliate Faculty Status

- Fixel Institute of Neurological Diseases, University of Florida
- Center for Environmental Building + Design, University of Pennsylvania

At External Board/ Organization

- Chair, ASHRAE Technical Committee (TC) 4.5 Fenestration Handbook Subcommittee
- Member, Board of Directors, National Fenestration Rating Council (NFRC)

Biography

Dr. Ravi Shankar Srinivasan is a Tenured Full Professor and Associate Dean for Research and Strategic Initiatives in the College of Design, Construction & Planning (DCP), University of Florida (UF), U.S. He holds a B.Arch degree from the National Institute of Technology (NIT), Tiruchirappalli, India; a M.S. degree in Civil Engineering from University of Florida; and M.S. and Ph.D. degrees in Architecture (Building Technology) from the University of Pennsylvania.

Dr. Srinivasan is a Certified Energy Manager (CEM), LEED Accredited Professional, Green Globes Professional (GGP), Certified U.S. Institute of Building Documentation (USIBD) Level of Accuracy v3.0., and U.S. Federal Aviation Administration (FAA) Certified Remote (Drone) Pilot and a FAA Student Pilot (Private). He is an external faculty collaborator with the Center for Environmental Building & Design at the University of Pennsylvania's School of Design. He is the Director of UrbSys (Urban Building Energy, Sensing, Controls, Big Data Analysis, and Visualization) Lab at the Rinker School of Construction Management in the DCP, University of Florida.

Dr. Srinivasan has served as PI and Co-PI on projects funded by external sponsored agencies including National Science Foundation (NSF), U.S. Housing and Urban Development (HUD), U.S. Veteran Affairs (VA), National Research Council (NRC) of Canada, Diakin Open Innovation Lab in the Silicon Valley, Nesta Enterprises UK, and other private companies. He has published one book as a lead author titled, “The Hierarchy of Energy in Architecture: Emergy Analysis,” Routledge and co-edited a book titled, “Smart Cities: Foundations, Principles, and Applications,” John Wiley & Sons. He has published six book chapters, 51 articles in very highly refereed journals and 50 referred conference proceedings accumulating over 5,800 citations. Out of the eight patents with U.S. Patent and Trade Office (USPTO) held by Dr. Srinivasan, four of them are licensed to a for-profit startup company in the U.S.

Dr. Srinivasan has advised undergraduate honors theses, chaired ten masters’ theses and seven Ph.D. dissertations and all of them were successfully employed in the industry including NVIDIA and academia. He teaches undergraduate and graduate courses including Building Energy Modeling. He served on the board of directors at the National Fenestration Rating Council (NFRC) for six years and, currently chairs the handbook subcommittee (TC 4.5) for the American Society of Heating, Refrigeration and Airconditioning Engineers (ASHRAE) Handbook of Fundamentals.

Educational Background

Ph.D. in Architecture (Building Technology)

University of Pennsylvania, Philadelphia, PA, USA.

Advisors:

Dr. William Braham, Professor of Architecture, School of Design, University of Pennsylvania

Dr. Daniel Campbell, Sr. Systems Ecologist, Atlantic Ecology Division (AED), US EPA

Dr. Charlie Curcija, Deputy Director, Windows & Daylighting Group, LBNL, US DOE.

Courses taken at Penn in addition to Building Technology courses: Undergraduate course in Computer Science: Computer Graphics (Dr. Norman Badler); Graduate-level courses in Computer Science Dept.: AI, Advanced AI, Computer Vision (Dr. Jianbo Shi); Electrical Engg. Dept.: Human Behavior Modeling (Dr. Barry Silverman).

M.S. in Architecture (Building Technology)

University of Pennsylvania, Philadelphia, PA, USA.

Advisor:

Dr. Ali Malkawi, Director of Harvard Center for Green Buildings and Cities, Harvard University

M.S. in Civil Engineering, *4.0 GPA*

University of Florida, Gainesville, FL, USA.

B. Architecture, *First Class with Distinction*

National Institute of Technology, Tiruchirappalli, TN, India.

Professional Certifications & Licenses

2021 **Certified Level of Accuracy v3.0**, US Inst. of Bldg. Documentation (USIBD) USA.
2020 **Student Pilot (Private)**, Federal Aviation Administration, USA.
2019 **FAA Remote Pilot (UAV)**, Federal Aviation Administration, USA.
2015 **OSHA Certification**, Occupational Safety & Health Administration, USA.
2012 **Green Globes Professional (GGP)**, Green Building Initiative, USA.
2008 **Certified Energy Manager (CEM)**, Association of Energy Engineers, USA.
2008 **Certified Instructor for C.E.M.**, Association of Energy Engineers, USA.
2004 **LEED Accredited Professional (LEED AP)**, US Green Building Council, USA.
1996 **Licensed Architect**, Council of Architecture, India.
1996 **Licensed Architect**, Indian Institute of Architects, India.

Professional Positions

2024 - Present **Associate Dean for Research and Strategic Initiatives**
College of Design, Construction & Planning, University of Florida, Gainesville, FL, USA.
2023 - Present **Full Professor** (tenured), University of Florida, Gainesville, FL, USA.
2021 – 2024 **Director of Graduate Programs & Research**
Rinker School of Construction Management, University of Florida, Gainesville, FL, USA.
2018 – 2023 **Associate Professor** (tenured), University of Florida, Gainesville, FL, USA.
2011 – 2018 **Assistant Professor** (tenure-track), University of Florida, Gainesville, FL, USA.
2009 – 2010 **Director, Technology & Innovation**, The Green Roundtable, Boston, MA, USA.
2002 **Associate Engineer**, Chen Moore & Associates, Ft. Lauderdale, FL, USA.
1998 – 2000 **Principal**, RSA Architects & Engineers, India.
1997 – 1998 **Architect & Project Manager**, Kennedy Bowen Associates, Singapore.
1996 – 1997 **Architect**, Bharath & Associates, India.

Administrative & Leadership Roles Held at University of Florida

2024 - Present **Associate Dean for Research and Strategic Initiatives, College of Design, Construction & Planning (DCP), University of Florida Academic Council**. My role encompasses both the creation and execution of new strategic initiatives for the college, as well as the comprehensive oversight of graduate, faculty, and research affairs.

2024 **Member, University of Florida Academic Council**. I have been selected to be one of sixty faculty out of the approximately 5,000 faculty of the newly formed UF Academic Council by the Office of the Provost. The members, in small groups, met with President Sasse and Provost Angle and discussed with each other and the officials.

2024 **Member, Post-Tenure Review (PTR) Committee, UF College of Design, Construction & Planning.** I am one of the four members of the College PTR Committee where we will develop the criteria for review that is discipline-specific, collaborate with the unit administrators and university leaders, and draft procedures for DCP for evaluating the faculty dossiers as applicable.

2023 **Member, University of Florida Graduate School Advisory Council**. I have been selected to be one of a handful members of the newly formed UF Graduate School Advisory Council by the Graduate School. The charge of the Council will be to provide consultation and advice to the Graduate School leadership in matters related to unit function and processes, innovative and strategic goals and benchmarks, graduate student concerns and care, and university partnerships.

2023 **Member, University of Florida Smart City Initiatives**. I am one of the few members of the UF Smart City Initiatives team. We will be travelling to Japan, in April, to visit universities as part of this new UF initiative. Provost Angle, Dean Stedman of the Graduate School, Dean Wayne of the UF International Center, Director Reed of AI2 Initiative, and a few others will be joining me on this trip, which includes signing collaborative agreements with two reputed universities in Japan.

2021 – 2024 **Director, Graduate Programs & Research, University of Florida.** I oversaw day-to-day management tasks and staff toward realizing the school's approved Strategic Plan for 2021-2025 related to Graduate Programs & Research. I led the effort to condense the prerequisites for both the masters and the PhD programs to make the Rinker School's programs more competitive with the PEER 7 Group[1] programs. In October 2021, the faculty overwhelmingly voted to approve the master's degree alignment which reduced the non-thesis credit hours, also increasing the competitiveness of the non-thesis Master of Construction Management (MCM) program. This is the first time in more than two decades such an effort to revamp the masters degree programs. Furthermore, starting Fall 2025, the Rinker School masters programs will be a three-semester degree programs.

Using both quantitative and qualitative data, I initiated a pause on the online, self-funded Master of International Construction Management (MICM) program, ultimately leading to its elimination. Additionally, I oversee the PhD Program at the Rinker School which has around forty active students. Other highlights include,

[1] The Rinker School is one of the PEER 7 Group for Construction Management Programs; the other six include Texas A&M University, Virginia Tech, Arizona State University, Colorado State University, Auburn University, and Purdue University.

- Increased domestic students over international students for the masters programs owing to the newly developed active recruitment approaches.
- Increasing the masters enrollment to balance the total graduate student numbers given the ongoing "countries of concern" legislation affecting doctoral enrollment.
- Streamlined the process for recruitment and retention of high-caliber graduate students to improve the quality of the graduate program.
- Streamlined the masters and doctoral admission process, resulting in updated and comprehensive handbooks.
- My strong working relationship with Associate Dean Kelleher of the Graduate School facilitated direct communication regarding graduate programs and student affairs, leading to expedited problem-solving and an understanding of the implications of new policy implementation at the university.
- Mentored junior faculty on navigating pre-award management such as UFIRST, budgeting, cost-share agreements, and other DCP & DSP policies related to research proposal submissions.
- With the improvement in the quality of the master's program, recruitment of Rinker School's masters students into the doctoral programs increased. This helped doctoral student recruitment and retention at the Rinker School.
- Mediated and resolved graduate student grievances before escalation to the college and the Graduate School.
- In collaboration with the Rinker School Industry Advisory Board (RSIAB), developed and implemented the Rinker Research where the RSIAB will support Rinker faculty research through data sharing and research dollars.

2018 – 2022 **Member, DCP Junior Faculty Mentorship Program, University of Florida**. In 2018, UF Associate Provost of Academic and Faculty Affairs initiated a new junior faculty mentorship program. I was one of the five faculty from DCP selected to be part of this mentoring program. At that time, I was the only member who did not hold a director or chair position within a DCP unit. We developed a multidisciplinary mosaic mentoring for onboarding our college-wide junior faculty.

- I was an invited presenter three times to meet and share my experiences as a teacher-researcher to the new DCP faculty hires.
- I developed and shared a pocketbook-sized success guide that contained the new hires my personal do's and don'ts for achieving greater success at DCP.
- These faculty continue to meet and discuss with me on their academic progress.

2016 – 2022 **Faculty Senator**, UF Faculty Senate, University of Florida. I was twice elected by the DCP faculty to the Senate back-to-back.

Administrative & Leadership Roles in the Industry

2021 – Present **Chair, ASHRAE TC 4.5** Fenestration, Handbook Subcommittee, Atlanta, GA. I am leading the updates to Chapter 15, "Fenestration," of the American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals. This involves leading discussions to identify necessary updates to the chapter due to new technologies and products, improved methodologies, updated fenestration-related code compliances, and other technical corrections. I interact with fenestration experts from the U.S. Dept. of Energy's national laboratories and industries. These major updates will be available in the next edition of the Handbook, which will be available for use by architects and engineers in 2025.

2019 – Present **Member, Board of Directors**, National Fenestration Rating Council (NFRC), Washington DC. The NFRC Board provides the direction, vision, and strategic planning for NFRC and assures that programs and policies are in place to meet the NFRC mission. I was twice elected back-to-back.

2019 **Founder and Organizer**, The First International Workshop on Building Energy Sensing, Controls, Big Data Analysis, and Visualization (UrbSys), ACM BuildSys, Nov 10, 2019, New York, NY.

2009 – 2010 **Director, Technology & Innovation**, The Green Roundtable, Boston MA.

1998 – 2000 **Principal, RSA Architects & Engineers**, India.

Research Publications' Summary

I have published three books, six book chapters, 49 articles in very highly refereed journals (see below list of example journals and their impact factors), and 50 referred conference proceedings accumulating over 5,300 citations[2].

Renewable and Sustainable Energy Reviews, *15.9*
Sustainable Cities and Society, *11.7*
Applied Energy, *11.2*
Journal of Cleaner Production, *11.1*
Automation in Construction, *10.3*
Building and Environment, *7.4*
Ecological Indicators, *6.9*
Energy and Buildings, *6.7*
Journal of Building Engineering, *6.4*

Patents' Summary

I have **eight patents** filed with U.S. Patent & Trademark Office (USPTO). Out of these, six were utility patents and available online at USPTO. Out of these utility patents, 3 (three) were further submitted to the International Patent Office (IPO), Switzerland for global intellectual rights/ patents review. One provisional and three non-provisional applications are currently in review at the USPTO. Four patents are licensed to a for-profit company. I have three invention disclosures with UF Innovate, the entrepreneurship arm of the university in 2024 and 2025.

[2] Google Citations' h-index and h10-index are 30 and 62 respectively.
https://scholar.google.com/citations?hl=en&user=yz0UIBoAAAAJ&view_op=list_works

RESEARCH AWARDS AND HONORS: I am honored to have received several research awards and work with numerous prestigious organizations (see below). Since 2018, I received "*University of Florida Term Professorship Award*" from the UF Office of the President[3]. In 2020, I received the "*Holland Professorship Award*" from the Rinker School[4]. In 2022, UF Innovate, that drives the innovation ecosystem at UF, awarded the patent that I co-invented as the "*Innovation of the Year Award*[5]."

Awards & Honors

I received university-level awards in all three areas of scholarship.

Research: Excellence Award for Assistant Professor (2016)
Teaching: Mentor/ Teacher of the Year Award (2017)
Service: Senior Faculty International Educator of the Year Award (2022)

RESEARCH, TEACHING, & SERVICE

2022 **$1M Million Cool Roofs Challenge Award,** UK
2022 **Senior Faculty International Educator of the Year Award**, University of Florida
2019 – 2021 **Holland Professor**, University of Florida
2017 – 2021 **University Term Professor**, University of Florida (selected twice consecutively)
2021 **DCP Service Award**, University of Florida
2020 **Best Paper Award**, *UAV-based Estimation of Lowest Floor Elevation*, Indonesia
2017 **Mentor/ Teacher of the Year Award**, University of Florida
2016 **Excellence Award for Assistant Professor Award**, University of Florida
2016 **Finalist, Energy Project of the Year Award**, South African Assoc. of Energy Eff.
2014 **Nancy Perry Teaching Excellence Award**, University of Florida
2014 **#1 Reviewer and Certificate of Excellence**, Building and Environmental Journal
2013 **Best Paper – Runner up**, Intl. Society of Mgmt. Science and Engg. Mgmt. Conf.
2011 **Invited Session Chair** (Limitations of Simulations), Building Sim. Conf., Australia
2011 **Sustainability Fellow**, Prairie Creek Project, University of Florida, FL
2010 **Innovation in Green Design Award**, USGBC Massachusetts Chapter, Boston MA
2007 **Top 24 Emerging Environmental Leader**, Environmental Leadership Program, PA
2007 **Chartered Legend in Energy Award**, Association of Energy Engineers, Atlanta, GA
2006 **Young CAADRIA Award**, CAD Design Research in Asia Conf., New Delhi, India

PROFESSIONAL BOARD MEMBERSHIPS

2022 – 2024 **Member, Board of Directors**, NFRC, Washington DC
2021 – Present **Chair, ASHRAE TC 4.5 Fenestration**, Handbook, Atlanta, GA
2019 – 2021 **Secretary, Executive Board & Member**, Board of Directors, NFRC, Washington
2015 – 2016 **Member, Board of Directors**, NFRC, Washington DC
2015 – 2016 **Member, Audit Committee**, NFRC, Washington DC
2017 – 2024 **Member, American National Standards (ANS) Com.**, NFRC, Washington DC
2012 – 2014 **Member, American National Standards (ANS) Com.**, NFRC, Washington DC
2010 **Member, Certification Board**, Building Energy Simulation Analyst (BESA), AEEE

[3] This award recognizes my scholarly achievement within the faculty ranks across DCP.
[4] This award recognizes my research excellence particularly the quality and innovativeness of the research.
[5] UF Innovate awarded six out of over 300 inventions by UF faculty across all disciplines.

2006 **Member, Board of Directors**, Delaware Valley Green Building Council, PA

ACADEMIC JOURNAL EDITORIAL BOARDS

2016 – Present **Member, Editorial Board**, Buildings MDPI
2016 – 2022 **Member, Editorial Board**, Journal of Power & Energy Engineering
2019 **Guest Editor,** Sustainability: Building Energy Prediction & Sus., Buildings MDPI

INTERNATIONAL: FOUNDER OF ORGANIZATION

2019, **Founder and Organizer**, The First International Workshop on Building Energy Sensing, Controls, Big Data Analysis, and Visualization (UrbSys), ACM BuildSys, Nov 10, 2019, New York.

INTERNATIONAL: KEYNOTE & PLENARY SPEAKER

2023, **Invited Keynote Speaker**, Importance of Research in Architecture, Built Environment and Technology, Chitkara University Doctoral Consortium, Nov 4.

2020, **Invited Plenary Speaker**. Micro- and Macro-scale Modeling, Simulation and Visualization of Low/ Net Zero Energy Buildings and Cities. The 20th International Conference on Sustainable Environment & Architecture, Urban Retrofitting: Building, Cities and Communities in the Disruptive Era. Univ. of Pendidikan, Indonesia. Nov 11.

2018, **Invited Keynote Speaker**. Advanced Modeling, Simulation and Visualization of Energy Use at Urban scale. Workshop on Improving Building Energy Efficiency, The Indo-US Science and Technology Forum (IUSSTF), Indian Institute of Technology (IIT), Roorkee and Central Building Research Institute (CBRI), India. Dec 20 – Dec 21.

2020, **Invited Plenary Speaker**, The 20th International Conference on Sustainable Environment & Architecture, Urban Retrofitting: Building, Cities and Communities in the Disruptive Era, University of Pendidikan, Bandung, Indonesia, Nov 10.

2018, **Invited Keynote Speaker**, Workshop on Improving Building Energy Efficiency, The Indo-US Science and Technology Forum (IUSSTF), Indian Institute of Technology (IIT), Roorkee and Central Building Research Institute (CBRI), India, Dec 20-21.

2018, **Invited Keynote Speaker**, Intl. Conference on SMART CITY Innovation, Bandung, Indonesia, Oct 25-26.

INTERNATIONAL: INVITED SPEAKER

2020, **Best Paper Award,** "*Preliminary Research in UAV-based Estimation of Lowest Floor Elevation for Flood Hazard Pre-Disaster Management*," The 20th International Conference on Sustainable Environment & Architecture, Urban Retrofitting: Building, Cities and Communities in the Disruptive Era, University of Pendidikan, Bandung, Indonesia, Nov 10.

2020, **Invited Session Chair** – Cities and COVID-19, BuildSys'20, November 19-20, Yokohama, Japan. 2020.

2020, **Invited Technical Program Committee**, The 7th ACM BuildSys Conference, Yokohama, Japan, Nov 16-19.

2015, **Invited Program Committee Member**, Empirical Modeling Conference, Brussels, Belgium.

NATIONAL: INVITED SPEAKER

2023, **Invited Speaker**, National Renewable Energy Laboratory (NREL), US DOE, Denver CO.

2021, **Invited Speaker**, Energy, Emergy + Carbon. Wood and Everything After, A Virtual Symposium. Littoral Urbanism Lab, University of Miami, Florida. Feb 25 – Feb 26, 2021.

2019, **Invited Speaker**, Micro- and Macro-scale modeling, simulation, and visualization of Net Zero Energy Buildings/ Cities. Department of Architecture, School of Design, University of Pennsylvania, Philadelphia, PA. Nov 7, 2019.

2016, **Invited Speaker**, Web-based Dynamic-Sustainability Information Modeling (D-SIM) Data Analytics Platform for

Urban Sustainability. US Environmental Protection Agency, Urban Sustainability Assessment & Management Workshop. Chicago, IL. Jul 20, 2016 - Jul 21, 2016.
2016, **Invited Speaker**, 47th Winter Simulation Conference, Washington, DC.
2016, **Invited Speaker**, Smart Audio Sensing-based HVAC Maintenance (SASEM). National Science Foundation (NSF) CPS PI Meeting. Washington, DC. Nov 1, 2016 - Nov 2, 2016.
2016, **Invited Presenter**, Global Health + Megacities, UF Innovations in Global Health Workshop Series, Theme: Information + Technology as Agents of Change.
2015, **Invited Speaker**, Soundscaping Urban Infrastructure for Predictive Maintenance. National Science Foundation (NSF) Early Career Investigator Workshop on Smart City and CPS. Seattle, WA. Apr 13, 2015 - Apr 17, 2015.
2015-2019, **Invited Graduate Seminar Presenter**, Department of Architecture, University of Pennsylvania, Philadelphia, PA (presented since 2011 every year)
2015, **Invited Presenter & Poster**, NIST Global City Challenge Festival, Washington, DC
2015, **Invited Presenter and Track Coordinator** (Project Management and Construction), 46th Winter Simulation Conference, Huntington Beach, CA
2014, **Invited Presenter and Track Coordinator** (Project Management and Construction) and Session Chair (Energy, Water & Crowd Simulations), 45th Winter Simulation Conference, Savannah, GA
2011, **Invited Presenter & Session Chair** (Construction Project Process Modeling & Simulation), 42nd Winter Simulation Conference, Phoenix, AZ.
2011, **Invited Presenter,** National Health and Environmental Effects Research Laboratory, US Environmental Protection Agency, Narragansett, RI. Title: "Re(de)fining Net Zero Energy: Renewable Emergy Balance of Environmental Building Design."
2010, **Invited Panelist**. State of MA Building Stretch Code Appendix 120 AA Adoption for Town of Brookline
2010, **Invited Presenter**, Net Zero Energy Design – Engineering, at ASHRAE Boston Product Show.
2010, **Invited Presenter**, Net Zero Energy Building Design, at AIA MetroWest, Needham, MA.
2010, **Invited Presenter**, Introduction to NZE Buildings, at Wentworth Institute of Technology, Boston, MA.
2010, **Invited Presenter**, Q&A session – NESEA Net Zero Energy Competition, Boston, MA.
2009, **Invited Presenter**, Net Zero Energy Building Studies, to the Leading By Example Program Team, Office of Energy and Environmental Affairs, State of Massachusetts, Boston, MA.
2009, **Invited Panelist**, State of MA Bldg. Stretch Code Appendix 120 AA for City of Cambridge, MA.
2009, **Invited Presenter**, LEED and its Impact on Civil Engineering, at ASCE, FL.

NATIONAL: INVITED PANEL REVIEWER, SESSION CHAIR, SUBJECT MATTER EXPERT

2015 & 2016, **NSF Panel Reviewer,** National Science Foundation Division of Computer and Network Systems, Cyber-Physical Systems in Smart Cities.
2015, **NSF Early-Career Investigators** Stipend & Position Paper Presenter, National Science Foundation Division of Computer and Network Systems, Cyber-Physical Systems in Smart Cities Workshop, Seattle, WA
2014, **Invited External Reviewer** for Graduate Theses, Graduate School of Design, Harvard University, Boston
2014, **Co-Organizer and Session Chair,** iiSBE Net Zero Built Environment Symposium and 17th Rinker International Conference, University of Florida, Gainesville, FL
2011, **Invited Subject Matter Expert,** National Renewable Energy Laboratory (NREL) Commercial Workforce Development, Boulder, CO
2011, **Sustainability Fellow**, Praire Creek Project, 2011.

Graduate Student Advising Summary

I have successfully advised a total of 73 graduate students. I also advised Postdocs and exchange PhD students and collaborated with invited Fulbright Scholars and international faculty visitors to the UrbSys Lab, UF. I have graduated 7 PhD students and 8 masters students as Committee Chair.

PhD students:	Committee Chair 12	Co-Chair 1	Member 18
Masters students:	Committee Chair 10	Co-Chair 10	Member 22

List of PhD student committees that I have chaired and their current place of employment:

1. Dr. Ali Komeily — McKinsey & Sons, Boston, MA, USA.
2. Dr. Zeyu Wang — Associate Professor, Guangzhou University, China.
3. Dr. Soheil Fathi — Technical Product Manager, Coda, CA, USA.
4. Dr. Dongsoo Kim — Project Manager, Yates Construction, TX, USA.
5. Dr. Mengda Jia — Nvidia, Seattle, WA, USA.
6. Dr. He Zhang — Assistant Professor, Xiamen University, China.
7. Dr. Haekyung Im — Faithful + Gould, Phoenix, AZ, USA.

Intellectual Property (IP) Rights & Patents

Invention Disclosure:

Non-Invasive Method to Determine the Argon Gas Content and Thermal Properties of Double-Glazing. T#: 19431

Systems and Methods for Transforming Building Information Models (BIM) into Digital Twins

Patents:

Systems and Methods for Automated Building Code Conformance.
Approved: Yes (ORD/UTIL 17/559504 dated 12/22/2021; published); currently, PCT/ International Patent System filed (PCT/US2022/070341 dated 01/25/2022)
Automated AI-based building code checking software development is in controlled release phase. Contracts were signed with division offices of two national builders to conduct plan review of specific chapters.
Description: Systems and methods to check the building permit application file information against relevant codes, ordinances, and regulations for code conformance checking as well as perform verification reporting based on input provided from the code checking modules. The software developed uses rule-based, Artificial Intelligence/ Machine Learning, and Image Processing.
Significance: (1) Improves the number of building code sections' conformance reviews for building permitting; (2) reduces manual labor and related subjectivity in code checking process; (3) reduces code conformance review duration drastically; and (4) scalable to multiple states in the U.S. as well as North America and European Union countries.

Virtual Zoning Review.
Approved: Yes (PROV 63/292113 dated 12/21/2021)
Contractual agreement was signed with a national site/ civil/ structural engineering firm to use the software for zoning plan reviews.

Description: Systems and methods for checking all land development code provisions and regulations per local, state, national or international requirements. The software developed uses rule-based, Artificial Intelligence/ Machine Learning, and Image Processing techniques.
Significance: (1) Improves accuracy for site zoning code conformance reviews; (2) reduces manual labor and related subjectivity in code checking process; (3) reduces code conformance review duration drastically; and (4) scalable to multiple states in the U.S.

Virtual Building Construction Inspection for Permitting.
Approved: Yes (PROV 63/231078 dated 08/09/2021)
Description: Systems and methods related to virtual building construction inspection for building permitting which includes, among others, software development to seamlessly transfer point cloud data to mesh for import into design software.
Significance: (1) Capturing inaccuracies in construction using LiDAR point-cloud capture; and (2) Seamless transfer of point-cloud data into BIM using new software developed inhouse.

Portable Smart Air Quality Multisensory System Equipped Carrying Case for Asthma Inhalers.
https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2022015937&_cid=P12-L2CM0O-74146-1
Approved: Yes (PCT/US2021/041757 dated 07/15/2021; published)
Description: The portable smart air quality multisensory system equipped carrying case for asthma inhaler comprises of (1) smart multisensory inhaler attachment device; (2) in the first-generation, a few high-resolution base-stations for auto-calibration located in a few sample spots with high degree of pollutants; later (in the second-generation), these can be integrated with attachment device charging stations with data upload/ download via mobile phones; (3) low-power WAN system to collect data transmitted from the multisensory attachment device in real-time; and (4) acquiring, mapping, and dissemination of the citizen-gathered data to third-party vendors. Uses ow-cost, low-energy sensors (O3, PM2.5, NO2, Airflow/ Anemometer Temperature, Relative Humidity, GPS).
Significance: (1) Monitors realtime, high-resolution environmental data by individual attachment devices which will, then, collectively be used to create real-time air quality data (2) Captures and disseminates real-time, high-resolution, auto-calibrated, air quality data acquisition, and mapping.

Unmanned Aerial Vehicle (UAV)-Based Non-Intrusive Building Envelope (Windows, Walls, and Roofs) Temperature, Velocity, Emissivity, and Reflectance Measurement System for Community-Wide Energy Mapping.
https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2022032097&_cid=P12-L2CM0O-74146-1
Approved: Yes (PCT/US2021/044945 dated 08/06/2021; published)
Description: Embodiments of the present disclosure provide unmanned aerial vehicle-based measurement techniques for building envelope surfaces to measure the current thermal performance of the external surface of the high-rise building is determined using the external air velocity, temperature, and IR measurements.
Significance: (1) Non-intrusive approach to determine building envelope degradation for non-operable high-rise buildings; (2) UAV enabled sensor system provides opportunity for community- or city-level mapping of envelope energy wastage.

Drone-based Lowest Floor Elevation.
Approved: Yes (PCT/US2021/072286 dated 11/08/2021; published)
Description: Embodiments of the present disclosure includes a computing device to acquire one or more infrared thermal aerial images of a building and one or more visible RGB aerial images of the building; identify structural components of the building based on the one or more infrared thermal aerial images of the building, wherein a floor structure of the building is identified from a color change in the one or more infrared thermal aerial images between the building and a foundation structure of the building; position a bounding box around the floor structure of the building present in the one or more infrared thermal aerial images; and estimate a lowest floor elevation of the building by calculating a lowest floor elevation value based on an amount of image pixels representing a distance between a top of the bounding box and a top of the foundation structure of the building.
Significance: (1) Rapid determination of flood hazard classification of building structures which is critical for pre-disaster management and post-disaster mitigation; (2) In addition to estimating Lowest Floor Elevation, the disclosure provides imaging methods for acquiring structural attributes of a building including an envelope energy performance signature.

Variable Air Variable Refrigerant Flow System
Approved: In Review (UF Docket No.: T1865US); non-provisional USPTO
Description: A Variable Air Variable Refrigerant Flow System (VAVRF) is a novel HVAC system that combines benefits of both the VAV and VRF technologies. An exemplary VAVRF system includes an air handling unit (AHU) section that is responsible for air movement, which contrasts with the VRF system in which air movement is provided by individual fans in each VRF indoor unit. An exemplary VAVRF system further includes an outdoor unit section that supplies the refrigerant to a VAVRF controller (e.g., heat recovery box/branch selector box). Unlike a traditional VRF system, a refrigerant pipe is coupled a pressure independent VAVRV indoor unit which contains airflow sensors, dampers, temperature sensors, and refrigerant coils. Both the damper actuation and the refrigerant flow using the electronic expansion valve (EEV) are controlled by the VAVRF controller.
Significance: The ability of the VAVRF system to be easily packaged, and for all the airflow to be centralized, leads to savings in cost, energy savings, better air cleaning, and better control.

Streamlined Single Software Workflow with ML-based Point Cloud Clustering for Virtual Reality Building Inspection.
Approved: In Review (UF Docket No.: T18924US001)
Description: Developing a single software workflow for a VR based visualization where users can visualize as-built and as-planned BIM data along for performing inspections.
Significance: This will provide the benefits of point cloud technology to more AECO professionals and increase the uptake of point cloud technology in the industry.

Publications

Books, Co-authored

1. **Srinivasan R S**, and Moe K. 2015. *The Hierarchy of Energy in Architecture: Emergy Analysis*. *PocketArchitecture: Technical Design Series*. Routledge. London, United Kingdom. 152. https://www.routledge.com/products/9781138803534
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95. **Srinivasan R S**, and Malkawi A M. 2004. The Use of Learning Algorithms for Real-time Immersive Data Visualization in Buildings. *Iberoamerican Congress of Digital Graphic (SIGRADI) Conference*.

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97. Malkawi A M and **Srinivasan R S**. 2004. Multimodal Human-Computer Interaction for Immersive Visualization: Integrating Speech-Gesture Recognitions and Augmented Reality for Indoor Environments. *IASTED Conference on Computer Graphics and Imaging*.
98. Malkawi A M and **Srinivasan R S**. 2004. Building Performance Visualization Using Augmented Reality. *International Conference on Computer Graphics and Vision*.
99. Malkawi A M, **Srinivasan R S**, Yi Y, and Choudhary R. 2003. Performance-based Design Evolution: The Use of Genetic Algorithms and CFD. *Eight IBPSA Conference Held in Eindhoven, The Netherlands*. 793-798.
100. Fukai D and **Srinivasan R S**. 2001. A Visual Decision Tool for Design and Construction Management. *Sixth International Conference on Information Visualization*. 376-381.
101. Fukai D and **Srinivasan R S**. 2001. Piece-based Construction Information System (PCIS) Revisited: A Visual Database for Design and Construction. *Twenty First Annual Conference of the Association for Computer-Aided Design in Architecture*. 372-379.

Non-refereed Publications

1. Valipoor S, **Srinivasan R S**, and Ahrentzen S. 2020. Virtual Reality for Older Adults with Movement Disorders: A Tool for Co-Designing Homes. *IAPS Conference, Québec City, Canada. June 2020*.
2. Ahrentzen S, **Srinivasan R S**, and Valipoor S. 2020. CODY: Using Virtual Reality for Co-Designing Residential Interiors for People with Parkinson's Disease. *AMPS Conference, Tallahassee, FL*.
3. Pasunuru R, Hakim H, Sakhalkar A, Kibert C J, and **Srinivasan R S**. 2014. Analysis of Meadowbrook Elementary School Energy Performance: Towards Net Zero. *In Proceedings of the iiSBE Net Zero Built Environment Symposium and Seventeenth Rinker International Conference, March 6-7, 2014, Gainesville, FL, USA*.
4. Kim D and **Srinivasan R S**. 2014. Urban Performance Simulations – A Review. *In Proceedings of the iiSBE Net Zero Built Environment Symposium and Seventeenth Rinker International Conference, March 6-7, 2014, Gainesville, FL, USA*.

Abstracts

1. **Srinivasan R S**, Parakh U, Campbell D E, Burgett J, Li J, Braham W W, and Nagi J. 2016. Build-Em: An Integrated Emergy and Environmental Accounting Tool for Buildings. *In Proceedings of the Ninth Biennial Emergy Conference, January 7-9, 2016, Gainesville, FL*.
2. **Srinvasan R S**, Ingwersen W, Trucco C, Ries R J, and Campbell D E. 2014. A Review of Integrated Environmental Assessment Methodologies in the Built Environment using a Case Study Building. *In Proceedings of the Eighth Biennial Emergy Research Conference, Gainesville, FL*.
3. **Srinivasan R S**, Campbell D E, and Wang W. 2012. Renewable Substitutability Index for Built Environments. *In Proceedings of the Seventh Biennial Emergy Research Conference, Gainesville*.
4. **Srinivasan R S**, Campbell D E, and Wei W. 2012. Emergy-LCA Synthesis for Built Environment: Challenges and Opportunities. *In Proceedings of Fourth International EcoSummit Symposium, September 30 - October 5, 2012, Columbus, Ohio, USA*.

Miscellaneous

1. **Srinivasan R S**. 2013. *Energy Assessment and Building Energy Performance Options for Green Globes for New Construction*. Green Building Initiative. 1-7. https://www.thegbi.org/training/green-resource-library/17/
2. **Srinivasan R S**. 2012. *Building Energy Analysis: The Present and Future*. Sustainable Construction, 3rd Edition.

University Governance and Service

a. University

a. **Faculty Senator**, 2019 – 2022; 2016 – 2019
I was elected to represent College of Design, Construction and Planning a second term after my promotion to Associate Professor.
b. **Sustainability Committee**, 2013 - 2019
c. **Carbon Action Plan Committee**, 2021 - 2022

b. College

a. **College-wide Mentor Program for Junior Faculty**, 2021 – 2022
I was one of the five faculty from the College of Design, Construction and Planning to be selected to be part of the college-wide mentor program for junior faculty.
b. **Witters Competition Committee**, 2017 - 2021
c. **Faculty Council**, 2017 - 2020
d. **Administrative Council**, 2017 – 2019

c. Department/ School

a. Director, **Graduate Programs & Research**, 2021 – Present
Among other things, I am proud to note that I led the effort of eliminating the credit discrepancies between the thesis and non-thesis master's degree programs at the Rinker School.
b. Chair, **Merit Pay Committee**, 2021 - Present
c. Member, **Graduate Research Committee**, 2011 – 2020
d. Member, **Merit Pay Committee**, 2020 – 2021
e. Member, **Endowment Committee**, 2020 – 2021
f. Member, **Faculty Advisory Committee**, 2014 – Present
g. Member, **Computing Committee**, 2013 – 2018

Editorial Boards, Reviews

EDITORIAL ADVISORY BOARDS

Buildings (ISSN: 2075-5309)
Date of Service: Since Jan 2015 to-date

Journal of Power and Energy Engineering
(ISSN Print: 2327-588X ISSN Online: 2327-5901)
Date of Service: Since Jan 2015 to-date

Reviewer for Scholarly Journals:

Building and Environment, Elsevier
Reviewer since 2011
Owing to my thorough review work, I was awarded *"#1 Reviewer + Certificate of Excellence."*

Energy and Building, Elsevier
Reviewer since 2013

Buildings, MDPI
Reviewer since 2015

Energy, Elsevier
Reviewer since 2013

Applied Energy, Elsevier
Reviewer since 2012

Building Research & Information
Reviewer since 2014

Intl. J. of Strategic Property & Management, Taylor & Francis
Reviewer since 2012

BOOK MANUSCRIPTS REVIEWED

"**Your Role in the Green Environment**," The National Center for Construction Education and Research (NCCER) textbook that provides fundamental instruction in the green environment, green construction practices, and green building rating systems. This textbook has been approved by USGBC for 15 GBCI general continuing education hours for LEED professionals.
Date of Service: 2016
Being Sustainable – Building Systems Performance
Author: Dennis Fukai, PhD
ISBN-10: 0976274132
ISBN-13: 978-0976274131
Date of Service: 2013

Memberships and Activities in the Profession

MEMBSHIPS

a. <u>International</u>
American Society of Heating, Refrigeration and Airconditioning Engineers (ASHRAE)
2020 - Present
United States Institute of Building Documentation (USIBD)
2021 - Present
Emergy Society
2012 - 2022
Association of Computing Machinery (ACM)
2011 – 2023
Association of Energy Engineers (AEE)
2007 – Present
International Building Performance Simulation Association (IBPSA)
2003 – 2020

b. <u>National</u>
Green Building Initiative
2012 – Present

c. **<u>Regional</u>** - None
d. **<u>State</u>** - None
e. **<u>Local</u>** – None

ACTIVITIES IN THE PROFESSION

a. <u>International</u>
<u>Chair, Handbook Subcommittee, Technical Committee 4.5 Fenestration</u>
ASHRAE Handbook - Fundamentals, ASHRAE, Atlanta, GA[6]
ASHRAE Handbook—Fundamentals covers basic principles and data used in the HVAC&R industry. The ASHRAE Technical Committees that prepare these chapters provide new information, clarify existing content, delete obsolete materials, and reorganize chapters to make the Handbook more understandable and easier to use. I chair the subcommittee (Technical Committee 4.5[7]) to update Chapter 15 – Fenestration. The next edition of ASHRAE Handbook – Fundamentals, to be published in 2025, will reflect the updates, among others, in Chapter 15.

[6] List of chapters in ASHRAE Handbook – Fundamentals is provided here: Table of Contents 2021 ASHRAE Handbook—Fundamentals
[7] ASHRAE Technical Committee 4.5 Fenestration is comprised of scientific/ technical experts from several US National Labs including NREL, ORNL, etc., as well as fenestration industry; Membership | ASHRAE 4.5 Fenestration

Founder and Organizer
The First International ACM Workshop on Building Energy Sensing, Controls, Big Data Analysis, and Visualization (UrbSys '19), **BuildSys 2019 Conference**, Columbia University, New York, NY. Nov 12, 2019.
UrbSys '19 brought together experts from both U.S. national labs (ORNL, PNNL, ANL, LBNL) and academia. This workshop captured recent exciting work by research experts, from U.S. universities and U.S. national laboratories, at this nexus that supports sustainable urban systems' design and engineering through state-of-the-art sensing, controls, modeling, and visualization. Three plenary speakers (Teja Kuruganti, ORNL; Mary Ann Piette, LBNL, and Carol Menassa, UMich) shared their work. A lightning round of presentations from UrbSys '19 paper authors was followed by two discussion topics (see agenda for details[8]).

Technical Program Committee Member
BuildSys 2017 Conference,
November 8-9, 2017, Delft, The Netherlands.
BuildSys is a selective forum for the presentation of research results on systems' issues in the area of building controls, energy management, embedded, and networked sensors. The conference provides an ideal convergence venue for the Sensor, Building and Energy research communities to address the research challenges facing the design, deployment, use, and fundamental limits of these systems.

Program Committee Member
The International Symposium on Empirical Modeling. June 21-26, 2015, Brussels, Belgium.
This symposium is aimed at determining the current state of development of Empirical Modeling and its potential in all of these respects.

International Scientific and Organizing Committee
Advances in Building Simulation Conference, Indian Institute of Technology (IIT-Madras), Chennai, India. 2013

International Organizing Committee
43rd Winter Simulation Conference, Berlin, Germany. 2012

Session Chair – "Limitations of Simulations in Practice, III & IV,"
International Building Performance Simulation Association (IBPSA) Conference, Sydney, Australia. 2011

b. **National**
Professional Board Membership, Committees:

Board Member
National Fenestration Rating Council (NFRC), 2015- 2016; 2019 – 2022.
Committee Member – American National Standards (ANS)

[8] More information (CFP, TPC) is available at: https://dcp.ufl.edu/rinker/acm/ . UrbSys '19 Workshop Proceedings is available @ ACM Digital Library; Proceedings of the 1st ACM International Workshop on Urban Building Energy Sensing, Controls, Big Data Analysis, and Visualization | ACM Other conferences

Among others, I oversaw the review of rating procedures for recognition under ANS requirements, 2013 – Present National Fenestration Rating Council (NFRC) , a not-for-profit 501(c)(3) organization, is an American National Standard Institute (ANSI) Accredited Standards Developer (ASD) and develops and administers comparative energy and related rating programs for fenestration products. As an ANSI ASD, NFRC submits designated NFRC rating procedures for recognition as American National Standards under ANSI's Essential Requirements.

Conferences:

Technical Program Committee Member, BuildSys 2016 Conference, November 16-17, 2016, Stanford, CA, USA
Track Coordinator – Project Management & Construction, 6th Winter Simulation Conference, Huntington Beach, CA. 2015
The Winter Simulation Conference (WSC) is the premier international forum for disseminating recent advances in the field of system simulation. In addition to a technical program of unsurpassed scope and quality, WSC provides the central meeting place for simulation practitioners, researchers, and vendors working in all disciplines in industry, service, government, military and academic sectors.

Conference Co-Organizer, iiSBE Net Zero Built Environment Symposium and 17th Rinker International Conference, University of Florida, Gainesville, FL. 2014.
iiSBE is International Initiative for a Sustainable Built Environment. iiSBE is an international non-profit organization whose overall aim is to actively facilitate and promote the adoption of policies, methods and tools to accelerate the movement towards a global sustainable built environment.

Track Coordinator – Project Management & Construction, 45th Winter Simulation Conference, Savannah, GA. 2014
Session Chair, iiSBE Net Zero Built Environment Symposium and 17th Rinker International Conference, University of Florida, Gainesville, FL. 2014
Session Chair – "Energy, Water & Crowd Simulations," 45th Winter Simulation Conference, Savannah, GA. 2014
Session Chair – "Energy Simulations," 43rd Winter Simulation Conference, Berlin, Germany. 2012
Session Chair – "Construction Project Process Modeling & Simulation," 42nd Winter Simulation Conference, Phoenix, AZ. 2011
The International Building Performance Simulation Association, is a non-profit international society of building performance simulation researchers, developers and practitioners, dedicated to improving the built environment. Building Simulation is the premier international event in the field of building performance simulation.