

Riccardo Talami, PhD

Research Fellow in Building Performance Simulation and Optimization
National University of Singapore (NUS)

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Bio

Riccardo is dedicated to advancing energy-efficient building design and operation to enhance occupant comfort and well-being. He advocates for data-driven approaches to empower building stakeholders in creating sustainable, comfortable, and efficient built environments. Riccardo brings expertise in Sustainable and Integrated Building Design, Performance-based Building Design, Building Performance Simulation and Optimization, Computational Design, Early-design Exploration and Informed Decision Making, Design Uncertainty and Robustness Analysis, Smart Buildings, HVAC Systems, Thermal Comfort, Daylighting, and Indoor Environmental Quality.

Experience

• **Research Fellow** January 2022 - current
Department of the Built Environment
National University of Singapore - NUS - (Singapore)

Duties: Led a team for research projects on Temperature Setpoints and Indoor Environmental Quality, and the development of online tools for practical applications. Collaborated on research projects related to Building Envelope Systems. Supervised final year students for research thesis and visiting scholars. Developed and published scientific papers. Managed the procurement for project expenses.

• **Researcher** January 2019 - January 2022
School of Architecture, Building and Civil Engineering
Loughborough University (Loughborough, United Kingdom)

Duties: Research on Building Performance Optimization. Developed and published scientific papers. Delivered lectures.

• **Co-Instructor and Teaching Assistant** September 2017 - December 2018
ASD - Architecture and Sustainable Design Pillar
Singapore University of Technology and Design - SUTD - (Singapore)

Duties: Developed coursework structure, teaching materials, and assignments. Delivered lectures, conducted weekly reviews and supervised final exams.

• **Research Assistant** March 2017 - December 2018
Design for Climate and Comfort Lab (DCC)
Singapore University of Technology and Design - SUTD - (Singapore)

Duties: Developed and conducted independent research on Radiant Cooling Systems in the Tropics and Human Behaviour in office settings. Collaborated on research projects related to Daylighting in Buildings and Building Performance of Tropical Building Typologies. Developed and published scientific papers.

• **Student Researcher** May 2016 - November 2016
Center for the Built Environment (CBE)
University of California Berkeley - (United States)

Duties: Researched on Radiant Cooling Systems, culminating in published scientific reports and the development of an online tool.

• **Architectural assistant** September 2013 - February 2014
Arch. Renzo Parise (Padova, Italy).

Duties: Collaborated on the design and development of residential projects. Produced 2D and 3D drawings. Attended meetings with clients. Assisted with the materials selection.

Education

- **Doctor of Philosophy (PhD) in Building Science/ Building Engineering** January 2019 - January 2022
School of Architecture, Building and Civil Engineering
Loughborough University (Loughborough, United Kingdom)

Thesis: The sequential design optimization of building performance.

- **Master of Science in Architecture and Innovation (Sustainable Design)** October 2014 - March 2017
UC Berkeley, University IUAV of Venice (Venice, Italy)

Thesis: Recent trends in radiant system technology for heating and cooling: analysis of the factors that influence the built environment - United States and Italy.

- **Bachelor of Science in Architecture** October 2011 - September 2014
University IUAV of Venice (Venice, Italy)

Skills summary

• Transferrable Skills

- Excellent journal, conference paper, and technical report writing skills.
- Ability to work in a team and independently.
- Good presentation and communication skills (verbal and written)
- Ability to work in a multidisciplinary and multicultural environment.
- Ability to work on several projects simultaneously, with clear deadlines and under pressure.

• Software and Technical

- **Energy Analysis:** Energy Plus (Conventional, Design Builder and Open Studio interfaces), ArchSim and Honeybee plug-ins for Grasshopper.
- **Energy Certification:** Master Clima 11300.
- **Solar and Environmental Analysis:** Ecotect, Climate Consultant.
- **Daylight Analysis:** Radiance (DIVA and Ladybug interfaces).
- **Parametric Modeling:** Rhinoceros/Grasshopper.
- **Statistics and Data Science:** R.
- **Programming:** Python, Java.
- **Environmental sensors:** HOBO products, DustTrak™ DRX Aerosol Monitor 8534, XL2 Audio and Acoustic Analyzer, VelociCalc Multi-Function Ventilation Meter 9565, RAE Systems ppbRAE 3000+ Portable Handheld VOC Monitor, Testo Luxmeter.
- **Microcontrollers:** Raspberry Pi, Arduino.
- **Architecture/Engineering drafting and modeling:** AutoCAD, ArchiCAD, Revit, SketchUp, Rhinoceros.
- **Graphic and editing:** Photoshop, Illustrator, InDesign.
- **General:** Microsoft Office package.

• Certifications/Courses

- Certified Peer Reviewer Course from Elsevier, January 8-9 2020.
- Grasshopper Level 1 course from McNeel, 12 hours , January 25-29 2021.
- Grasshopper Level 2 course from McNeel, 18 hours , January 25-29 2021.

• Languages

- **English:** Full Professional proficiency.
- **Italian:** Native proficiency.
- **French:** Elementary proficiency.
- **Spanish:** Elementary proficiency.

Research projects

Project Leader:

- Human-centric Indoor environmental quality (IEQ) September 2022 - current
- Dynamic temperature setpoints and setbacks under weather and occupancy variability January 2022 - current
- The sequential design optimization of building performance January 2019 - January 2022
- Radiant Cooling Systems in the Tropics March 2017 - December 2018
- Optimizing Radiant Systems for Energy Efficiency and Comfort May 2016 - November 2016

Collaborator:

- Innovative building envelope systems June 2023 - current
- Comparing laboratory and field studies of occupant lighting experience July 2018 - current
- Subjective and measured evidence for residential lighting metrics in the tropics July 2018 - December 2018
- Sustainable Futures: Cooling March 2017 - December 2018

Products and tools development

- Indoor Environmental Quality sensor package v.1.0 September 2022 - April 2023

Designed and assembled 20 Raspberry-pi-based sensor packages that monitor 9 Indoor Environmental Quality metrics continuously: Carbon dioxide, Particulate matter, Total volatile organic compound, Illuminance, Temperature, Humidity, and Sound. Prototyped and 3D printed 20 boltless sensor enclosures for easy assembly and maintenance.

- Indoor Environmental Quality sensor package v.2.0 September 2023 - current

Designed and assembled 40 Arduino-based sensor packages that monitor 4 IEQ parameters continuously. Prototyped and 3D printed 40 sensor enclosures with reduced dimensions. Introduced fast-charging battery and Wi-Fi connection.

- Optimal Temperature Setpoint Tool September 2022 - April 2023

The Optimal Temperature Setpoint Tool allows the user to identify the optimal temperature setpoint based on occupancy rates, patterns, and outdoor air temperature values (available at <https://building-robotics-lab.github.io/brlab/#/otst>).

- CBE Radiant Systems Map May 2017 - October 2017

The CBE Radiant Systems Map displays a database of over 400 commercial buildings using radiant cooling and heating in the world as online interactive map (available at <http://bit.ly/RadiantBuildingsCBEv2>). The tool has obtained 18.000 views so far.

Teaching and Supervision

- Center for the Energy Resilience and the Built Environment (ERBE):
Loughborough University (United Kingdom)
Role: Invited lecturer. May 2021 - May2021

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Loughborough University (United Kingdom)
Role: Invited lecturer. May 2020 - May2020

- 20.112 Sustainable Design Option Studio 2: May 2018 - December 2018
Singapore University of Technology and Design - SUTD - (Singapore)
Role: Teaching Assistant.
- 20.112 Sustainable Design Option Studio 3: January 2018 - April 2018
Singapore University of Technology and Design - SUTD - (Singapore)
Role: Teaching Assistant.
- 20.111 - 20.501 Sustainable Design Option Studio 1: January 2018 - April 2018
Singapore University of Technology and Design - SUTD - (Singapore)
Role: Teaching Assistant.
- 20.223 History, Theory and Culture 3: September 2017 - December 2017
Contemporary Architecture Between Technology, Science and Culture.
Singapore University of Technology and Design - SUTD - (Singapore)
Role: Co-Instructor.
- Supervision: Xudong Jia (Master student, October 2022 - current), Ilyas Dawoodjee (Research Assistant, May 2022 - November 2023), Xinhao Hu (visiting PhD candidate, January 2023 - January 2024), Glenda Cheng (undergraduate dissertation), June 2022 - March 2023), Sabrina Tay and Shirlynn Koh (undergraduate dissertation, December 2022 - March 2023), Thomas Firsich (visiting Master student, July 2023 - September 2023)

External academic experience

- Reviewer for Building Simulation 2019: 16th Conference of IBPSA August 2018 - September 2019
2-4 September 2019, Rome (Italy).
- Reviewer for Building Simulation and Optimization 2020 September 2019 - September 2020
21-22 September 2020, Loughborough (UK), on-line.
- Reviewer for Building Simulation 2021: 17th Conference of IBPSA August 2020 - September 2021
1-3 September 2021, Bruges (Belgium), in-person and on-line.
- Reviewer for Building Simulation 2023: 18th Conference of IBPSA August 2022 - September 2023
4-6 September 2023, Shanghai (China), hybrid
- Reviewer for Journal of Architectural Engineering January 2024 - current

Publications

- Journal papers: 3, Conference papers: 4, Reports: 1, Thesis: 1, Undergoing peer-review: 3, In process: 6.

Publications are available at: <https://scholar.google.com/citations?user=EmFyzowAAAAJ&hl=en>.

Awards

- UK Engineering and Physical Sciences Research Council Scholarship, Engineering and Physical Sciences Research Council (2019 - 2022).
- Winner of Best Poster Award for "Subjective and Measured Evidence for Residential Lighting Metrics in the Tropics" (in collaboration with Jakubiec, J. Alstan; Srisamranrungruang, Thanyalak; Kong, Zhe; Quek, Geraldine), 16th International IBPSA Conference (2019).