

Dr. Miguel Martin

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Education

Ph.D.	National University of Singapore , Building Science	Singapore Aug 2016 – March 2021
	<ul style="list-style-type: none"> GPA: 4.3/5.0 Advisor: Prof. WONG Nyuk Hien Thesis: <i>Physically-based modelling of interactions between a building and its outdoor conditions at the urban microscale</i> 	
M.Sc.	University of Geneva , Computer Science	Geneva, Switzerland Jan 2009 – June 2011
	<ul style="list-style-type: none"> GPA: 5.7/6.0 Advisor: Prof. PUN Thierry Master Thesis: <i>Biometric authentication using human brain activity</i> 	
B.Sc.	University of Geneva , Computer Science	Geneva, Switzerland Oct 2005 – Dec 2008
	<ul style="list-style-type: none"> GPA: 5.0/6.0 Advisor: Prof. MARCHAND-MAILLET Stephane End-year Project: <i>An asynchronous web application to navigate over a large set of images</i> 	

Awards, Fellowships, and Grants

Marie Curie Global Fellowship (score: 96/100) , European Commission, EUR 297,000	Oct 2022 – Feb 2026
Best Paper Award , Sustainable Built Environment Conference, Tokyo (Japan)	Aug 2019
Best Presentation Award , Sustainable Built Environment Conference, Tokyo (Japan)	Aug 2019
President's Graduate Fellowship , National University of Singapore, EUR 72,000	Jan 2019 - Nov 2020
Virtual Singapore Grant , National Research Foundation of Singapore, EUR 670,000	Mar 2018 - May 2021
NUS Research Scholarship , National University of Singapore, EUR 61,000	Aug 2016 - Dec 2018

Research Experience

Carnegie Mellon University , Visiting Research Scholar	Pittsburgh, United States Jan 2023 – Present
<ul style="list-style-type: none"> Couple detailed building energy models and a data-driven urban canopy model to perform simulations at the neighborhood scale. Analyze the impact of interactions between buildings and their outdoor environment on the calibration of urban building energy models. Develop full data-driven models to perform simulations of interactions between buildings and their outdoor environment at the city scale. Conduct field experiments to collect data for training and testing the models. 	
Delft University of Technology , Postdoctoral Fellow	Delft, Netherlands Oct 2022 – Present
<ul style="list-style-type: none"> Generate building energy models from 3D city models expressed in CityJSON. Simulate carbon dioxide in the outdoor air using computational fluid dynamics. 	
Berkeley Education Alliance for Research in Singapore , Senior Research Engineer (Nov 2020 - Nov 2021) and Postdoctoral Fellow (Nov 2021 - June 2022)	Singapore Nov 2020 – June 2022
<ul style="list-style-type: none"> Reviewed the literature in infrared thermography for the built environment. Collected thermal images of the built environment on a university campus. Processed and analyzed thermal images of the built environment. 	

National University of Singapore, Research FellowSingapore
Sep 2015 – Jul 2016

- Analyze the importance of interactions between buildings and their outdoor environment in the assessment of their energy consumption.
- Monitor the concentration of PM2.5 during haze episodes in Singapore.

Masdar Institute of Science and Technology, Research EngineerAbu Dhabi, United Emirates
Sep 2013 – Aug 2015

- Couple a detailed building energy model with a single-layer urban canopy model.
- Validate the coupled scheme using measurements of the outdoor air temperature and humidity in Abu Dhabi (United Arab Emirates) and Basel (Switzerland).

Teaching Experience

Co-instructor	Carnegie Mellon University Autonomous Sustainable Buildings: From Theory to Practice (12-770), Overall teaching score: 4.2 (when CMU average was 4.2)	Spring 2024
Teaching Assistant	National University of Singapore Digital construction (PF1103)	Spring 2019
	University of Geneva Project in software engineering (CS 13X008)	Spring 2010
	University of Geneva Software engineering (CS 13X003)	Fall 2009

Professional Development

CCAI Virtual Summer School , ClimateChange.AI community	June 2024 - Aug 2024
University Teaching Qualification Module ASSESS , Delft University of Technology	Jan 2023 - Feb 2023
University Teaching Qualification Module DESIGN , Delft University of Technology	Nov 2022 - Dec 2022
Training Program for Teaching Assistants , National University of Singapore	Dec 2016

Invited Talks

Simulations of interactions between buildings and their outdoor conditions at multiple scales In Civil Engineering Seminar Series, Smart Living Lab, Ecole Polytechnique Federale de Lausanne, Fribourg, Switzerland 🔗	Sept 13 2024
Machine Learning Applied to Urban Building Energy Modelling and Climate Risk Assessment In ClimateChange.AI (CCAI) discussion seminar series No. 1 🔗	June 17 2024
Updates on Urban Heat Islands studies for the Marie Curie fellowship In BUDS Lab seminar, National University of Singapore, Singapore	March 25 2024
Smart City Innovations and Experiments using New Climate and Energy Simulations (SCIENCES) In CAPS seminar, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States	Feb 20 2023
Smart City Innovations and Experiments using New Climate and Energy Simulations (SCIENCES) In AIS seminar, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States	Jan 20 2023
Coupling EnergyPlus with urban canopymodels In Cooling Singapore seminar, Singapore-ETH Center, Singapore	April 2 2020

Academic Service

Reviewer for: [Applied Energy](#), [Building and Environment](#), [Computers, Environment and Urban Systems](#), [Energy and Buildings](#), [Frontiers of Architectural Research](#), [Journal of Building Engineering](#), [Sustainable Cities and Society](#), and [Urban Climate](#)

Moderator for: [eSim 2024 Conference](#), [ASim 2024 Conference](#), and [ClimateChange.AI Discussion Seminars](#)

Collaborator for: [BEAM Project](#)

Journal Publications

InfraRed Investigation in Singapore (IRIS) Observatory: Urban heat island contributors and mitigators analysis using neighborhood-scale thermal imaging March 2024

Martin Miguel, Vasantha Ramani, and Clayton Miller

[Energy and Buildings](#), p.113973

Districtscale surface temperatures generated from high-resolution longitudinal thermal infrared images Dec 2023

Lin Subin, Vasantha Ramani, **Martin Miguel**, Pandarasamy Arjunan, Adrian Chong, Filip Biljecki, Marcel Ignatius, Kameshwar Poola, and Clayton Miller

[Scientific Data](#), 10(1), p.859

Longitudinal thermal imaging for scalable non-residential HVAC and occupant behaviour characterization May 2023

Ramani Vasantha, **Miguel Martin**, Pandarasamy Arjunan, Adrian Chong, Kameshwar Poola, and Clayton Miller

[Energy and Buildings](#), 287, p.112997

Infrared thermography in the built environment: A multi-scale review Sept 2022

Martin Miguel, Adrian Chong, Filip Biljecki, and Clayton Miller

[Renewable and sustainable energy reviews](#), 165, p.112540

Singapore: an integrated multiscale urban microclimate model for urban planning in Singapore Jan 2022

Lim Tian Kuay, Nyuk Hien Wong, Marcel Ignatius, **Miguel Martin**, Hann-Ming Henry Juang, Jing Lou, and Robert Lee Kong Tiong

[Urban Climate Science for Planning Healthy Cities](#), pp.189-217

A physically-based model of interactions between a building and its outdoor conditions at the urban microscale April 2021

Miguel Martin, Wong Nyuk Hien, Ignatius Marcel, Hii Daniel Jun Chung, He Yueer, Yu Zhongqi, Deng Ji-Yu, Srivatsan V. Raghavan, and Nguyen Ngoc Son

[Energy and Buildings](#), 237, p.110788

An integrated multiscale urban microclimate model for the urban thermal environment Jan 2021

Wong Nyuk Hien, Yueer He, Ngoc Son Nguyen, Srivatsan V. Raghavan, **Miguel Martin**, Daniel Jun Chung Hii, Zhongqi Yu, and Jiyu Deng

[Urban Climate](#), 35, p.100730

Multi-scale urban system modeling for sustainable planning and design Dec 2017

Lim Tian Kuay, Marcel Ignatius, **Martin Miguel**, Nyuk Hien Wong, and Hann-Ming Henry Juang

[Energy and Buildings](#), 157, pp.78-91


- Comparison between simplified and detailed EnergyPlus models coupled with an urban canopy model** Dec 2017
Martin Miguel, Nyuk Hien Wong, Daniel Jun Chung Hii, and Marcel Ignatius
[Energy and Buildings, 157, pp.116-125](#)
- A new validation protocol for an urban microclimate model based on temperature measurements in a Central European city** Feb 2016
Martin Miguel, Afshin Afshari, Peter R. Armstrong, and Leslie K. Norford
[Energy and Buildings, 114, pp.38-53](#)
- Estimation of urban temperature and humidity using a lumped parameter model coupled with an EnergyPlus model** June 2015
Martin Miguel, Afshin Afshari, Peter R. Armstrong, and Leslie K. Norford
[Energy and Buildings, 96, pp.221-235](#)

Conference Papers

- Coupling between detailed building energy models and a data-driven urban canopy model** June 2024
Martin Miguel, Mario Berges, Jantien Stoter, and Clara Garcia Sanchez
[Passive and Low Energy Architecture:\(RE\) THINKING RESILIENCE \(pp. 729-734\). Wroclaw University of Technology](#)
- Impact of interactions between buildings and their outdoor conditions on the calibration of an urban building energy model** June 2024
Martin Miguel, Mario Berges, Jantien Stoter, and Clara Garcia Sanchez
[eSim 2024: 13th Conference of IBPSA-Canada, p. 151. IBPSA, 2024](#)
- Impact of retro-reflective glass façades on the surface temperature of street pavements in business areas of Singapore and Tokyo** Aug 2019
Martin Miguel, Wong Nyuk Hien, and Masayuki Ichinose
[IOP Conference Series: Earth and Environmental Science \(Vol. 294, No. 1, p. 012020\). IOP Publishing](#)
- Comparison between a simplified and detailed building energy model coupled with an urban canopy model** May 2016
Martin Miguel, Daniel Jun Chung Hii, Marcel Ignatius, and Wong Nyuk Hien
[Proceedings of the 4th International Conference on Countermeasures to Urban Heat Island National University of Singapore, Singapore, pp. 1-16. 2016](#)
- Predictability of urban air temperature changes from variations of PM2.5 concentration during the 2015 Southeast Asian transboundary haze episode** May 2016
Martin Miguel, Daniel Jun Chung Hii, Marcel Ignatius, and Wong Nyuk Hien
[Proceedings of the 4th International Conference on Countermeasures to Urban Heat Island National University of Singapore, Singapore, pp. 1-16. 2016](#)
- Validation of a lumped thermal parameter model coupled with an EnergyPlus model using BUBBLE data** May 2015
Martin Miguel, Afshin Afshari, Peter R. Armstrong, Leslie K. Norford, Eberhard Parlow, and Roland Vogt
[9th International Conference on Urban Climate](#)

MOBO–An experimental network for urban heat island analysis in a green district of the Middle-East

May 2015

Martin Miguel, Afshin Afshari, Peter R. Armstrong, Leslie K. Norford, and Prashanth R. Marpu [9th International Conference on Urban Climate](#) 

Validation of a Coupled-Scheme Urban Canopy Model and Building Simulator

Oct 2014

Martin Miguel, Afshin Afshari, Peter R. Armstrong, and Leslie K. Norford [3rd International Conference on Countermeasures to Urban Heat Island](#) 