# Matias **Quintana**

Ph.D. Candidate · Building Technology

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## Education

### National University of Singapore — *Singapore*

Ph.D. Student at the School of Design and Environment — *2018 - Present*

- Relevant Coursework: Building Energy Performance Active & Passive Systems, Neural Networks and Deep Learning, Theory and Algorithm for Machine Learning, Uncertainty Modeling in AI, Advanced Topics in Robotics-Human Robot Interaction

### Carnegie Mellon University — *Pittsburgh, PA*

Master of Information Systems Management — *2015 - 2016*

- Relevant Coursework: OOP in Java, Database Management, Distributed Systems, Data Mining, Data Structures for Application Programmers, Exploring & Visualizing Data, OO Analysis and Design, Linux & Open Source, Internet Technologies, Applied Machine Learning

### Pontifical Catholic University of Peru — *Lima, Peru*

Bachelor of Science, Electronic Engineering, Honors list - 2nd place in class of 2014 — *2009 - 2014*

- Relevant Coursework: Electronic Design I and II, Theory of Communication I and II, Computer Architecture, Electronic Project I and II, Sustainable Energy, Information Systems Workshop
- Thesis: "3D Point Cloud Registration Using a Kinect for 3D Reconstruction of Archaeological Walls" (**ES PDF** )

## Research Experience

### Department of Building - School of Design and Environment, National University of Singapore — *Singapore*

Graduate Research Assistant, Building and Urban Data Science Laboratory (**BUDS Lab**), Singapore-Berkeley Building Efficiency and Sustainability in the Tropics 2 (**SinBerBEST2**) — *August. 2018 - Present*

- Developed open-source smartwatch application **Cozie** for field experiments regarding human subjective comfort
- Developed back-end pipeline and analytics dashboard for in-house experiments and research collaborations
- Conducted longitudinal field studies with wearable technology for health and subjective comfort monitoring
- Analyzed global portfolio of building electricity consumption for anomaly detection, forecasting, and missing data imputation
- Organized and maintained laboratory computational resources used for scientific research

### Civil and Environmental Engineering Department, Carnegie Mellon University — *Pittsburgh, PA*

Graduate Research Assistant, Intelligent Insfrastructure Research Lab (INFERLab) — *Apr. 2017 - Jun. 2018*

- Conducted a Thermal Comfort Study to predict and evaluate thermal comfort of smart buildings occupants, using a combination of different data-driven and thermal modelling methods, given environmental sensor data and bio-metrics
- Designed, produced, and programmed an AC waveform power meter board based on an Atmega328p for the Raspberry Pi
- Collaborated in Department of Energy funded project: Human-in-the-loop Sensing and Control for Commercial Building Energy Efficiency and Occupant Comfort
- Designed and implemented a data preparation and evaluation framework with Bosch U.S. research scientists for RGBD building occupancy data
- Implemented a BACnet agent on a Raspberry Pi to control HVAC systems on a building based on real-time occupancy data

### H. John Heinz III College, Carnegie Mellon University — *Pittsburgh, PA*

Graduate Teaching Assistant for Database Management — *Aug. 2016 - Dec. 2016*

- Assisted in grading assignments, projects, and exams
- Designed database based on existing students' clubs for future assignments
- Suggested improvements on previous assignments and proposed alternative solutions
- Held office hours and laboratory sessions to help students with assignments and class' concepts

## Professional Experience

### VIT Initiative, LLC. — *Pittsburgh, PA*

Firmware & Mobile Developer — *Dec. 2017 - Jun. 2018*

- Reviewed and finished company's firmware and propietary algorithm for embedded device
- Developed data collection pipeline for Internet of Things (IoT) device, mobile devices, and web servers
- Designed and developed mobile application functionality and User Interface (UI) for IoT sensor and web server interaction
- Assembled, tested, and performed demostration of fully finalized commercial product on clients' site and funding events

### Banking Commission — *Majuro, Republic of Marshall Islands*

Intern, Technology Consultant — *May 2016 - Jul. 2016*

- Assessed current state of technology infrastructure and information management, focus on potential areas for improvement
- Designed, proposed, and implemented solutions to improve the data collection and analysis process of the Financial Intelligence Division, to start their online presence, and to improve the security and reliability of their email communication
- Provided training and workshops for the office employees in the use and maintenance of the implemented systems.
- Elaborated comprehensive **final report** with detailed description of the project and further recommendations

**IBM** *Lima, Peru*

Intern, IT Storage Student Specialist *Apr. 2014 - Jul. 2015*

- Administered backend storage and SAN infrastructure for different platforms
- Initiated and maintained a storage devices inventory in the main datacenters for internal infrastructure improvement and optimization; reduced time for cabling and implementation requests by 75%
- Elaborated a new technology service based on IBM's products and CAMSS strategy, followed up by a presentation to the top management team as part of the 2015 Student Challenge
- Enforced security parameters and procedures for storage infrastructure and internal audits

# Teaching & Mentoring Experience

### School of Design and Environment - National University of Singapore

Graduate Research Student *2018 - Present*

- Mentored **7** undergraduate students in their Final Year Project research design and data analysis which enabled the successful completion of their research projects and resulted in publications at international conferences
- Designed and implemented quizzes and programming assignments for an online class released on the **edX** platform: **Data-Science-for-Construction-Architecture-and-Engineering**
- Conducted experimental laboratory sessions to further explain class' concepts (Module PF1108: Introduction to Bulding Performance)
- Held office hours and conducted laboratory/tutorial sessions for students regarding python and data analytics for the built environment (Module PF1103: Digital Construction)

### Heinz College - Carnegie Mellon University

Graduate Research Student *2016*

- Held office hours and laboratory sessions to help students with assignments and class' concepts (Module 95-703: Database Management)
- Suggested improvements on previous assignments and proposed alternative solutions
- Designed new database for future homeworks

# Selected Publications

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|---|---|---|
| 2020 | **Balancing thermal comfort datasets: We GAN, but should we?**, Matias Quintana, Stefano Schiavon, Kwok Wai Tham, and Clayton Miller. In Proceedings of the 7th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys '20), **DOI** | *New York City, NY, USA* |
| 2020 | **Humans-as-a-Sensor for Buildings: Intensive Longitudinal Indoor Comfort Models**, Prageeth Jayathissa, Matias Quintana, Mahmoud Abdelrahman, and Clayton Miller. Buildings, 10(174), 1-23, **DOI** | - |
| 2019 | **Islands of misfit buildings: Detecting uncharacteristic electricity use behavior using load shape clustering**, Matias Quintana, Pandarasamy Arjunan, and Clayton Miller. Building Simulation, **DOI** | - |
| 2019 | **Towards Class-Balancing Human Comfort Datasets with GANs**, Matias Quintana, Clayton Miller. In Proceedings of the 6th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys '19), **DOI** | *New York City, NY, USA* |
| 2019 | **OccuTherm: Occupant Thermal Comfort Inference using Body Shape Information**, Jonathan Francis, Matias Quintana, Nadine Von Frankenberg, and Mario Bergés. In Proceedings of the 6th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys '19), **DOI** | *New York City, NY, USA* |
| 2019 | **Is your clock-face cozie? A smartwatch methodology for the in-situ collection of occupant comfort data**, Prageeth Jayathissa, Matias Quintana, Tapeesh Sood, Negin Narzarian, and Clayton Miller. Climate Resilient Buildings - Energy Efficiency & Renewables in the Digital Era, CISBAT2019 | *Lausanne, Switzerland* |

# University & Public Engagements

### Spanish Department - Center for Language Studies, National University of Singapore

Volunteer *Aug. 2020 - Present*

- Practiced conversations and pronunciation with students enrolled in level 2 Spanish modules SPA2/LAS2201
- Engaged with local students wanting to learn about Hispanic culture
- Assisted in video interviews assignments between local students and Spanish native speakers

### Office of Student Affairs, National University of Singapore

Resident Assistant *Jun. 2020 - Present*

- Organised social and professional development events for students living on campus
- Provided emotional and mental health support to on-campus residents
- Assisted in promoting educational and collaboration opportunities within local and exchange students

### ASHRAE Student Branch, National University of Singapore

Secretary *Feb. 2020 - Present*

- Organised company visits for members and secondary and univeristy students
- Represented the Singapore student chapter in international ASHRAE events
- Collaborated with industry partners for events and internship opportunities for current student members

### Building Research Students Network (BRSnet), School of Design and Environment, National University of Singapore

President, former Treasurer *Aug. 2019 - Present*

- Elaborated budget for year-long events regarding incoming and existing research students at the deparment
- Coordinated workshops with current students to promote research projects, collaborations, and practice sessions for oral qualification exams and conferences presentations
- Promoted tools and skills to facilitate the implementation and use of data science and machine learning in research projects

### Tanglin Secondary School - National University of Singapore Academic Mentoring

Student Mentor *Sep. 2019 - Dec. 2019*

- Mentored Junior Secondary School students in Mathematics, Chemistry, Physics, and English
- Collaborated with students in classroom games and sports
- Discussed, with Secondary School teacher, ways to improve homework and exercises to motivate students

### Internet of Things Club, H. John Heinz III College, Carnegie Mellon University

Co-founder and Technical Director *Jun. 2016 - Dec. 2016*

- Gave technical training during workshops. Covered topics such as sensors, microcontrollers, light weight communications protocols, and circuit design
- Prepared projects for different laboratories and workshops sessions held by the club
- Designed and built PCBs for the club's hardware resources
- Established partnership with Dell's IoT Solutions division and invited to attend the DellEMC World 2016 conference

### Latino Graduate Student Association (LGSA), Carnegie Mellon University

President *Dec. 2015 - Dec. 2016*

- Organized social and academic events for the Latino Community on campus
- Represented the Latino Community at Minority Leadership metings with the Provost and Associate Deans
- Raised funds and created awareness for Latino local charities and initiatives through traditional cooking events

## Services

2021 **Third International Workshop on Applied Machine Learning for Intelligent Energy Systems (AMLIES)**, TPC

2020 **Eighteenth ACM Conference on Embedded Networked Sensor Systems (SenSys 2020) and Seventh ACM International Conference on Systems for Energy-Efficient Built Environments (BuildSys 2020)**, Student Volunteer

2020 **Seventh ACM International Conference on Systems for Energy-Efficient Built Environments (BuildSys 2020)** , Assistant Reviewer

2020 **Eleventh ACM International Conference on Future Energy Systems (e-Energy 2020)** , Assistant Reviewer

2020 **Applied Energy Journal**, Assistant Reviewer

2020 **Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)**, Reviewer

2020 **Second International Workshop on Applied Machine Learning for Intelligent Energy Systems (AMLIES)**, TPC

## Awards & Scholarships

2018 - 2022 **NUS PhD Research Scholarship**, National University of Singapore

2015 - 2016 **Graduate Admission Scholarship**, Carnegie Mellon University

## Skills

**Programming Languages** Python, Java, SQL, C, C++

**Tools/Software** LaTeX, EAGLE, Fusion360, RStudio, Matlab/Octave

**Hardware** Atmel Microcontroller, Raspberry Pi, Qualcomm DragonBoard

**Languages** Spanish: Native, English: Proficient, Chinese: **Basic**, French: Basic