Matias Alberto Quintana Rosales

Work & Research Experience

Future Cities Lab Global, Singapore-ETH Centre

Singapore, SG

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Postdoctoral Researcher and Module Coordinator

04/2023 - Present

- Industrial research: Collaborated with government agencies and industry partners for AI-based solutions at the urban scale.
- **Project Management**: Led and managed a team of **6 researchers** (PostDocs, Ph.D. students, and Software developers) across Singapore and Zürich on an **SG\$1,000,000** project.
- Data Science: Mentored Ph.D. students and visiting scholars regarding machine learning and data science projects at the building and urban level.

Chair of Computational Social Science, ETH Zürich

Zürich, CH

Visiting Researcher

09/2023 - 10/2023

- Industrial research: Met with local industry partners ESRI R&D Zürich, to start research exchanges and concretise collaborations.
- Project Management: Prepared and organised presentations and reports for the Future Cities Lab Global conference, the Scientific Advisory Committee, and Singapore-ETH Centre researchers.
- Data Science: Engaged and started research projects with Prof. Dirk Helbing chair including Ph.D. students and PostDocs.

College of Design and Engineering, National University of Singapore

Singapore, SG

Postdoctoral Research Fellow (BUDSLab)

08/2022 - 03/2023

- Field experiments: Led field studies with wearable technology for health and thermal comfort monitoring.
- Data Science: Lab research and development manager, handled machine learning and data science projects at the building and urban level.

College of Design and Engineering, National University of Singapore

Singapore, SG

Graduate Research Assistant (BUDSLab, SinBerBEST2)

08/2018 - 08/2022

- Field experiments: Conducted field studies with wearable technology for health and thermal comfort monitoring.
- Data Science: Performed unsupervised and semisupervised learning research on a global portfolio of building
 electricity consumption and field experiment datasets for thermal comfort. Main collaborator and content creator for
 MOOC Data Science for Construction Architecture and Engineering (2021 edX Prize Finalist for
 Innovation in Online Teaching).
- o Hardware & Software: Organized and maintained laboratory computational resources for scientific research.

Civil and Environmental Engineering Dept., Carnegie Mellon University

Pittsburgh, US

Graduate Research Assistant, Intelligent Insfrastructure Research Lab (INFERLab)

04/2017 - 06/2018

- Industrial research: Collaborated in a Department of Energy-funded project regarding Sensing and Control for Commercial Building Energy Efficiency and Occupant Comfort.
- Data Science: Designed and implemented a data preparation and evaluation framework with Bosch U.S. research scientists for RGBD building occupancy data.
- Hardware: Designed, produced, and programmed an AC waveform power meter board based on an Atmega328p for the Raspberry Pi.

VIT Initiative, LLC. (Acquired by SWORD Health)

Pittsburgh, US

Firmware & Mobile Developer

12/2017 - 06/2018

- **Product development**: Assembled, tested, and performed demonstration of a fully finalized commercial product on clients' sites and funding events.
- Data Science: Developed data collection pipeline for Internet of Things (IoT) devices, mobile devices, and web servers.
- Software: Designed and developed mobile application functionality and user interface for IoT sensor and web server interaction.

Banking Commission of the Republic of Marshall Islands

Majuro, MH

Intern, Technology Consultant

05/2016 - 07/2016

- Consulting: Assessed the current state of technology infrastructure and information management and provided recommendations (comprehensive final report)
- Software: Designed, proposed, and implemented data collection and analysis solution for the Financial Intelligence Division.

Future Cities Lab Global, Singapore-ETH Centre

Singapore, SG

Postdoctoral Researcher and Module Coordinator

04/2023 – Present

- o Mentoring:
 - * Mentored 3 Ph.D. students, 1 Research Assistant, and 1 Software Developer in research projects and theses.
 - * Organised and ran workshops and seminars for Machine Learning and Cloud computing tools and effective science communication.

Faculty of Science and Engineering, Pontifical Catholic University of Peru

Lima, PE

Visiting Lecturer

02/2024 - 03/2024

Course 1IND41 - Where (and when) is Waldo?: Introduction to Urban analytics and Geospatial
 Artificial Intelligence (GeoAI): Created syllabus and content from scratch and taught lectures, hands-on sessions,
 and laboratory sessions for undergraduate engineering students.

Chair of Computational Social Science, ETH Zürich

Zürich, CH

Visiting Researcher

09/2023 - 10/2023

 Course 052-0653-23L - Future Cities Laboratory Indicia 03: Actions and evidences for future settlements: Gave 2 lectures and facilitated discussions among undergraduate and graduate students at the Department of Civil, Environmental and Geomatic Engineering (D-BAUG)

College of Design and Engineering - National University of Singapore

Singapore, SG

Teaching assistant

08/2020 - 03/2023

- o Mentoring: Mentored 11 B.Sc., 2 M.Sc., and 3 Ph.D. students in research projects and their theses.
- Online teaching: Main collaborator and content creator for MOOC Data Science for Construction Architecture and Engineering (2021 edX Prize Finalist for Innovation in Online Teaching).
- Courses: Held office hours and taught hands-on sessions and laboratory sessions
 - * PF1103 Digital Construction (Undergraduate)
 - * PF3211 AI Applications for the Built Environment (Undergraduate)
 - * BPS5229 Data Science for the Built Environment (Graduate)

Heinz College - Carnegie Mellon University

Pittsburgh, PA

 $Teaching\ Assistant$

08/2016 - 12/2016

• Course 95-703 - Database Management: Held office hours and laboratory sessions to help students with assignments and class concepts, improved assignments, and designed new homework

EDUCATION

National University of Singapore (Singapore): Ph.D. Engineering Thesis: Cohort-based Personal Comfort Models for HVAC Occupant-Centric Control Carnegie Mellon University (USA): Master of Info. Sys. Mngmt. Modules: Data Mining; Machine Learning; Data Structures and Algorithms Pontifical Catholic University of Peru (Peru): B.Sc. Electronic Eng. Modules: Electronic Design; Computer Architecture; Web Technologies

Publications

• As of Wednesday 17th July, 2024; H-index: 12; Citations: 609

• Journals

- 11. Hou, Y., Quintana, M., Khomiakov, M., Yap, W., Ouyang, J., Ito, K., Wang, Z., Zhao, T. & Biljecki, F. (2024). Global Streetscapes A comprehensive dataset of 10 million street-level images across 688 cities for urban science and analytics. ISPRS Journal of Photogrammetry and Remote Sensing, 215, 216–238. https://doi.org/10.1016/j.isprsjprs.2024.06.023
- 10. Fu, C., Kazmi, H., Quintana, M. & Miller, C. (2024). Creating synthetic energy meter data using conditional diffusion and building metadata. Energy and Buildings, 312, 114216. https://doi.org/10.1016/j.enbuild.2024.114216
- 9. Mosteiro-Romero, M., Quintana, M., Stouffs, R. & Miller, C. (2024). A data-driven agent-based model of occupants' thermal comfort behaviors for the planning of district-scale flexible work arrangements. Building and Environment, 111479. https://doi.org/10.1016/j.buildenv.2024.111479
- 8. Liguori, A., Quintana, M., Fu, C., Miller, C., Frisch, J. & Treeck, C. van. (2024). Opening the Black Box: Towards inherently interpretable energy data imputation models using building physics insight. Energy and Buildings, 114071. https://doi.org/10.1016/j.enbuild.2024.114071
- 7. Fu, C., Quintana, M., Nagy, Z. & Miller, C. (2024). Filling time-series gaps using image techniques: Multidimensional context autoencoder approach for building energy data imputation. Applied Thermal Engineering, 236, 121545. https://doi.org/10.1016/j.applthermaleng.2023.121545

- 6. Nagy, Z., Henze, G., Dey, S., Arroyo, J., Helsen, L., Zhang, X., Chen, B., Amasyali, K., Kurte, K., Zamzam, A., Zandi, H., Drgoňa, J., Quintana, M., McCullogh, S., Park, J. Y., Li, H., Hong, T., Brandi, S., Pinto, G., Capozzoli, A., Vrabie, D., Berges, M., Nweye, K., Marzullo, T., & Bernstein, A. (2023). Ten questions concerning reinforcement learning for building energy management. Building and Environment, 110435. https://doi.org/10.1016/j.buildenv.2023.110435
- 5. Quintana, M., Schiavon, S., Tartarini, F., Kim, J., & Miller, C. (2023). Cohort comfort models—Using occupant's similarity to predict personal thermal preference with less data. Building and Environment, 227, 109685. https://doi.org/10.1016/j.buildenv.2022.109685
- 4. Tartarini, F., Schiavon, S., Quintana, M., & Miller, C. (2022). Personal comfort models based on a 6-month experiment using environmental parameters and data from wearables. Indoor Air, 32(11). https://doi.org/10.1111/ina.13160
- 3. Quintana, M., Stoeckmann, T., Park, J. Y., Turowski, M., Hagenmeyer, V., & Miller, C. ALDI++: Automatic and parameter-less discord and outlier detection for building energy load profiles. Energy & Buildings, 265, 112096. (2022). https://doi.org/10.1016/j.enbuild.2022.112096
- 2. Jayathissa, P., Quintana, M., Abdelrahman, M., & Miller, C. Humans-as-a-sensor for buildings: Intensive longitudinal indoor comfort models. Buildings, 10(174), 1–23. (2020). https://doi.org/10.3390/buildings10100174
- 1. Quintana, M., Arjunan, P. & Miller, C. (2021). Islands of misfit buildings: Detecting uncharacteristic electricity use behavior using load shape clustering. Building Simulation, 14(1), 119–130. https://doi.org/10.1007/s12273-020-0626-1

Conferences

- 26. Fu, C., Kazmi, H., Quintana, M. & Miller, C. (2023). Enhancing Classification of Energy Meters with Limited Labels using a Semi-Supervised Generative Model. Proceedings of the 10th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation, 450–453. https://doi.org/10.1145/3600100.3626633
- 25. Mosteiro-Romero, M., Quintana, M., Miller, C. & Stouffs, R. (2023). From Personal Comfort to District Performance: Using Smartwatch and WiFi Data for Occupant-Driven Operation. Proceedings of the 10th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation, 278–279. https://doi.org/10.1145/3600100.3626259
- 24. Miller, C., Quintana, M., Frei, M., Chua, Y. X., Fu, C., Picchetti, B., Yap, W., Chong, A. & Biljecki, F. (2023). Introducing the Cool, Quiet City Competition: Predicting Smartwatch-Reported Heat and Noise with Digital Twin Metrics. Proceedings of the 10th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation, 298–299. https://doi.org/10.1145/3600100.3626269
- 23. Jin, X., Fu, C., Kazmi, H., Balint, A., Canaydin, A., Quintana, M., Biljecki, F., Xiao, F. & Miller, C. (2023). The Building Data Genome Directory An open, comprehensive data sharing platform for building performance research. Journal of Physics: Conference Series, 2600(3), 032003. https://doi.org/10.1088/1742-6596/2600/3/032003
- 22. Maisha, K., Frei, M., Quintana, M., Chua, Y. X., Jain, R. & Miller, C. (2023). Utilizing wearable technology to characterize and facilitate occupant collaborations in flexible workspaces. Journal of Physics: Conference Series, 2600(14), 142009. https://doi.org/10.1088/1742-6596/2600/14/142009
- 21. Mosteiro-Romero, M., Miller, C., Quintana, M., Chong, A. & Stouffs, R. (2023). Leveraging campus-scale Wi-Fi data for activity-based occupant modeling in urban energy applications. Journal of Physics: Conference Series, 2600(13), 132008. https://doi.org/10.1088/1742-6596/2600/13/132008
- Quintana, M., Nagy, Z., Tartarini, F., Schiavon, S., & Miller, C. (2022). ComfortLearn: Enabling agent-based occupant-centric building controls. Third ACM SIGEnergy Workshop on Reinforcement Learning for Energy Management in Buildings & Cities (RLEM) (RLEM '22), 4. https://doi.org/10.1145/3563357.3566167
- 19. Miller, C., Chua, Y. X., Frei, M., & Quintana, M. (2022). Towards smartwatch-driven just-in-time adaptive interventions (JITAI) for building occupants. The 9th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys '22), 4. https://doi.org/10.1145/3563357.3566135
- 18. Zhan, S., Quintana, M., Miller, C., & Chong, A. (2022). From Model-Centric to Data-Centric: A Practical MPC Implementation Framework for Buildings. BuildSys '22 Proceedings of the 9th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation, 4. https://doi.org/10.1145/3563357.3564077
- 17. Teo, Y. T., Quintana, M., Bin, M. Z., Tan, C., Chong, A., & Miller, C. (2022). Dataset: Green Mark certified buildings metadata from Singapore. The Fifth International Workshop on Data: Acquisition To Analysis (DATA '22), 4. https://doi.org/10.1145/3560905.3567771
- 16. Quintana, M., Abdelrahman, M., Frei, M., Tartarini, F., & Miller, C. (2021). Longitudinal Personal Thermal Comfort Preference Data in the Wild. Proceedings of the 19th ACM Conference on Embedded Networked Sensor Systems, 556–559. https://doi.org/10.1145/3485730.3493693
- 15. Quintana, M. (2021). Cohort-Based Personal Comfort Models for HVAC Occupant-Centric Control. Proceedings of the 8th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation, 242–243. https://doi.org/10.1145/3486611.3492386
- 14. Nazarian, N., Liu, S., Kohler, M., Lee, J. K. W., Miller, C., Chow, W. T. L., Alhadad, S. B., Martilli, A., Quintana, M., Sunden, L., & Norford, L. K. (2021). Project Coolbit: Can your watch predict heat stress and thermal comfort sensation? Environ. Res. Lett., 16. https://doi.org/10.1088/1748-9326/abd130

- 13. Miller, C., Abdelrahman, M., Chong, A., Biljecki, F., Quintana, M., Frei, M., Chew, M., & Daniel, W. (2021). The Internet-of-Buildings (IoB) Digital twin convergence of wearable and IoT data with GIS / BIM. CISBAT 2021 Carbon Neutral Cities Energy Efficiency & Renewables in the Digital Era, EPFL, July. https://doi.org/10.1088/1742-6596/2042/1/012041
- 12. Sae-Zhang, P., Quintana, M., & Miller, C. (2020). Differences in thermal comfort state transitional time among comfort preference groups. 16th Conference of the International Society of Indoor Air Quality and Climate: Creative and Smart Solutions for Better Built Environments, Indoor Air 2020, November.
- 11. Quintana, M., Schiavon, S., Tham, K. W., & Miller, C. (2020). Balancing thermal comfort datasets: We GAN, but should we? In Proceedings of the 7th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (pp. 120–129). Virtual Event, Japan. https://doi.org/10.1145/3408308.3427612
- 10. Sood, T., Quintana, M., Jayathissa, P., Abdelrahman, M., & Miller, C. (2019). The SDE4 Learning Trail: Crowdsourcing occupant comfort feedback at a net-zero energy building. CISBAT2019 Climate Resilient Buildings Energy Efficiency & Renewables in the Digital Era. https://doi.org/10.13140/RG.2.2.33265.12644
- 9. Quintana, M., & Miller, C. (2019). Poster Abstract: Towards Class-Balancing Human Comfort Datasets with GANs. BuildSys '19 Proceedings of the 6th ACM International Conference on Systems for Energy-Efficient Built Environments. https://doi.org/10.1145/3360322.3361016
- 8. Nazarian, N., Miller, C., Norford, L., Kohler, M., Chow, W., Kai, J. L., Alhadad, S. B., Quintana, M., Sunden, L., & Martilli, A. (2019). Project CoolBit Updates: Personal Thermal Comfort Assessments using Wearable Devices. Geophysical Research Abstracts, 21, 13042.
- 7. Munir, S., Francis, J., Quintana, M., Frankenberg, N. V., & Bergés, M. (2019). Dataset: Inferring Thermal Comfort using Body Shape Information Utilizing Depth Sensors. In ACM (Ed.), DATA'19 Proceedings of the 2nd Workshop on Data Acquisition To Analysis (pp. 13–15). https://doi.org/10.1145/3359427.3361915
- Miller, C., Quintana, M., & Glazer, J. (2019). Twenty years of building simulation trends: Text mining and topic modeling of the BLDG-SIM email list archive topic modeling of the BLDG-SIM email list archive. IBPSA2019 Proceedings of the International Building Performance Simulation Association. https://doi.org/10.13140/RG.2.2.24955.46885
- 5. Francis, J.*, Quintana, M.*, Frankenberg, N. Von, Munir, S., & Bergés, M. (2019). OccuTherm: Occupant Thermal Comfort Inference using Body Shape Information. In BuildSys '19 Proceedings of the 6th ACM International Conference on Systems for Energy-Efficient Built Environments]. New York, NY, USA. https://doi.org/10.1145/3360322.3360858
- 4. Jayathissa, P., Quintana, M., Sood, T., Narzarian, N., & Miller, C. (2019). Is your clock-face cozie? A smartwatch methodology for the in-situ collection of occupant comfort data. In CISBAT2019 Climate Resilient Buildings Energy Efficiency & Renewables in the Digital Era. Lausanne, Switzerland.
- 3. Flores, F., Munir, S., Quintana, M., Prakash, A., & Bergés, M. (2019). Dataset: Occupancy Detection, Tracking, and Estimation Using a Vertically Mounted Depth Sensor. DATA'19 Proceedings of the 2nd Workshop on Data Acquisition To Analysis, 7–9. https://doi.org/10.1145/3359427.3361916
- 2. Quintana, M., Lange, H., & Bergés, M. (2017). Demo: Design and Implementation of a Low-cost Arduino-based High-Frequency AC Waveform Meter Board for the Raspberry Pi. BuildSys '17 Proceedings of the 4th ACM International Conference on Systems for Energy-Efficient Built Environments. https://doi.org/10.1145/3137133.3141441
- 1. Munir, S., Tran, L., Francis, J., Shelton, C., Singh Arora, R., Hesling, C., Quintana, M., Krishnan Prakash, A., Rowe, A., & Bergés, M. (2017). Demo: FORK: Fine grained Occupancy estimatoR using Kinect on ARM Embedded Platforms. BuildSys '17 Proceedings of the 4th ACM International Conference on Systems for Energy-Efficient Built Environments. https://doi.org/10.1145/3137133.3141461

Media

- 4. Net-Zero Energy buildings interview, TF1, 2023
- 3. Science Communication Outreach, National University of Singapore, 2023
- 2. Presenter and panelist at Workshop on Applications and Research in Data Science (TARECDA), 2022, 2023
- 1. Interviewed about scientific and professional career, Andina News Agency, 2022

AWARDS

Ph.D. Travel Fellowship

University of Nebraska-Lincoln (UNL), Future of the Building Industry (FOBI) Workshop, Nebraska U.S.

2022

Innovation in Online Teaching Finalist

edX

Buildings Best Paper Award

Buildings MDPI Journal 2020

Ph.D. Research Scholarship

National University of Singapore 2018

Admission Scholarship

• Heinz College, Carnegie Mellon University 2015

Second Place Best Poster

Euromed: International Conference on Cultural Heritage

SERVICE

• Grants

SPACE - Spatial Perception for Activities for City Evaluations (Submitted), RIE2025 CoT V4 "Understanding Impact of Urban Design on Public Space User Perception and Behaviour", SG\$1,700,000 - Principal Investigator (Singapore, 2024)

2014

- Annual Research Project Competition, Pontifical Catholic University of Peru, **PEN50,000 (approx. SG\$18,000)** Reviewer (2024)
- o Context-aware and human-centric assessment of the urban environment: From individual experiences to collective understanding in the city and beyond (Submitted and not granted), RIE2025 CoT H1 "The Impact of The Built Environment on Mental Wellbeing", SG\$1,000,000 Principal Investigator (Singapore, 2023)
- o Climate Change AI Innovation Grants, up to USD150,000 (approx. SG\$204,000) Reviewer (2023)

• Journals

- IEEE Pervasive Computing Reviewer (2024)
- Energy and Buildings Reviewer (2024)
- Science and Technology for the Built Environment Reviewer (2024)
- Building and Environment Reviewer (2021, 2023, 2024)
- Building Simulation Reviewer (2023)
- o Scientific Reports Reviewer (2023)
- Building Performance Simulation Reviewer (2022)
- Building Engineering Reviewer (2022)
- $\circ\,$ Ambient Intelligence and Humanized Computing Reviewer (2021)
- $\circ\,$ Applied Energy Assistant Reviewer (2020)
- Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) Reviewer (2020)

• Conferences

- o LatinX in Computer Vision Workshop at CVPR (LXCVCVPR) Reviewer (2024)
- Workshop on Tackling Climate Change with Machine Learning at the International Conference on Learning Representations (ICLR) - Technical Program Committee (2023, 2024)
- ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys) Technical Program Committee (2021, 2022, 2023, 2024); Organisation Committee (2021, 2022, 2023); Poster/Demo Co-Chair (2023); Sponsorship Co-Chair (2021, 2022); Student Volunteer (2020)
- o ACM SIGEnergy Workshop on Reinforcement Learning for Energy Management in Buildings & Cities (RLEM) Technical Program Committee Co-Chair (2021, 2022, 2023); Web Chair (2021)
- International Workshop on Applied Machine Learning for Intelligent Energy Systems (AMLIES) Technical Program Committee (2020, 2021, 2022, 2023)
- Workshop on Tackling Climate Change with Machine Learning at the Conference on Neural Information Processing Systems (NeurIPS) - Program Committee (2021, 2022, 2023)
- Workshop on Tackling Climate Change with Machine Learning at the International Conference on Machine Learning (ICML) - Program Committee (2021)
- $\circ\,$ e
Sim 2020 Building simulation meets building data, IBPSA Canada Reviewer (2021)
- o ACM International Conference on Future Energy Systems (e-Energy) Assistant Reviewer (2020)

University & Public Engagement

Access Singapore, NGO Operations and Communications volunteer; mentor	Singapore, SG 03/2023 - Present
Global Young Scientists Summit, National Research Foundation Participant and presenter	Singapore, SG 01/2023
Science Outreach Team, NUS Presenter	Singapore, SG 08/2022 - 03/2023
Woodlands Social Centre Volunteer and Consultant	Singapore, SG 02/2022 - 12/2022
Office of the Senior Deputy President and Provost, NUS Member of the National University of Singapore (NUS) Board of Discipline	Singapore, SG 07/2021 - 06/2022
Office of Student Affairs, NUS Resident Assistant and Secretary	Singapore, SG 06/2020 - 06/2022
ASHRAE Student Branch, NUS Secretary	Singapore, SG 02/2020 - 05/2021
Building Research Students Network, NUS President; former Treasurer	Singapore, SG 08/2019 - 07/2022
Office of Student Affairs, NUS Mentor at Teach with Heart@Tanglin Secondary School	Singapore, SG 07/2019 - 10/2019
Internet of Things Club, Carnegie Mellon University Co-founder and Technical Director	Pittsburgh, PA 06/2016 - 12/2016
Latino Graduate Student Association, Carnegie Mellon University President; former Treasurer	Pittsburgh, PA 08/2015 - 12/2016

Hobbies & Skills

- Hobbies: Weightlifting, running, salsa dancing, playing string instruments, photography
- Languages: Spanish, English, French, Chinese
- Programming & Scripting languages: Python, Bash, SQL, JAVA, R, MATLAB, C/C++

REFERENCES

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Assistant Professor, National University of Singapore

Clayton Miller Email: clayton@nus.edu.sg

Associate Professor, National University of Singapore

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Professor, UC Berkeley

Mario Bergés Email : marioberges@cmu.edu

Professor, Carnegie Mellon University