Matias Alberto Quintana Rosales

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Work & Research Experience

- **Future Cities Lab Global, Singapore-ETH Centre** — Singapore, SG
  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**).
  - **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.

Teaching & Mentoring Experience

- **Future Cities Lab Global, Singapore-ETH Centre** — Singapore, SG
  Postdoctoral Researcher — *04/2023 – Present*
  - **Mentoring**: Mentored **3** Ph.D. students, **1** Research Assistant, and **1** Software Developer in research projects and theses.
- **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*
  - **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*** — 2018-2022
  Thesis: Cohort-based Personal Comfort Models for HVAC Occupant-Centric Control
- **Carnegie Mellon University (USA): *Master of Info. Sys. Mngmt.*** — 2015-2016
  Modules: Data Mining; Machine Learning; Data Structures and Algorithms
- **Pontifical Catholic University of Peru (Peru): *B.Sc. Electronic Eng.*** — 2009-2014
  Modules: Electronic Design; Computer Architecture; Web Technologies

Publications

- **As of January 13, 2024; H-index: 11; Citations: 471**
- **Journals**

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

20. 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
6. 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 *2021*
- **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 *2014*

Service

- **Grants**
  - Context-aware and human-centric assessment of the urban environment: From individual experiences to collective understanding in the city and beyond (*Under review*), RIE2025 CoT H1 "The Impact of The Built Environment on Mental Wellbeing", **SG$1,000,000 (approx. CHF 659,000)** - Principal Investigator (Singapore, 2023)
  - Climate Change AI Innovation Grants, up to **USD 150,000 (approx. CHF 127,000)** - Reviewer (2023)
- **Journals**
  - Science and Technology for the Built Environment - Reviewer (2024)
  - Building and Environment - Reviewer (2021, 2023, 2024)

- Building Simulation - Reviewer (2023)
- Scientific Reports - Reviewer (2023)
- Building Performance Simulation - Reviewer (2022)
- Building Engineering - Reviewer (2022)
- Ambient Intelligence and Humanized Computing - Reviewer (2021)
- Applied Energy - Assistant Reviewer (2020)
- Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) - Reviewer (2020)

- **Conferences**
  - ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys) - Organisation Committee (2021, 2022, 2023); Sponsorship Co-Chair (2021, 2022); Poster/Demo Co-Chair (2023); Student Volunteer (2020)
  - 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 Learning Representations (ICLR) - Program Committee (2023)
  - Workshop on Tackling Climate Change with Machine Learning at the International Conference on Machine Learning (ICML) - Program Committee (2021)
  - eSim 2020 Building simulation meets building data, IBPSA Canada - Reviewer (2021)
  - ACM International Conference on Future Energy Systems (e-Energy) - Assistant Reviewer (2020)

University & Public Engagement

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

Hobbies & Skills

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

References

- **Filip Biljecki** — Email : filip@nus.edu.sg
  Assistant Professor, National University of Singapore
- **Clayton Miller** — Email : clayton@nus.edu.sg
  Associate Professor, National University of Singapore
- **Stefano Schiavon** — Email : schiavon@berkeley.edu
  Professor, UC Berkeley
- **Mario Bergés** — Email : marioberges@cmu.edu
  Professor, Carnegie Mellon University