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Luis Quintero

Associate Senior Lecturer
Stockholm University
Curriculum vitæ

Research Interests

User modeling in immersive interactive environments
Immersive Technologies (VR, MR, XR)
Human-Centered Artificial Intelligence
Wearables and body sensing technologies

Employment

- 2019–present **Researcher**, *Stockholm University*, Stockholm, Sweden
Department of Computer and Systems Sciences, (DSV). Member of the Data Science Group 🔗.
Design, run, and evaluate research projects in the fields of data science and explainable artificial intelligence with focus in digital personalization from human sensing and immersive technologies.
- 2018–present **Founder/Technical Lead**, *PortalSense*, Manizales, Colombia
Leads the strategic vision and technical product development operations in a startup helping real estate companies commercialize their new projects with interactive VR applications. Website 🔗.
- Summer 2019 **Research Assistant**, *Stockholm University*, Stockholm, Sweden
Department of Computer and Systems Sciences, (DSV). Member of the Data Science Group 🔗.
Developing a web platform to showcase application of explainability algorithms on healthcare data.
- 2017–2019 **Consultant/Developer**, *Independent Contractor*, Remote
Designed and developed VR applications for professional training (*USA*), architectural visualization (*Colombia*), and healthcare (*Sweden*). Details of these projects available on my website 🔗.
- Spring 2017 **Research Assistant**, *NeuroRehabLab-Interactive Technologies Institute*, Madeira, Portugal
Designed and developed interactive applications to support mental and physical well-being tasks through heart rate and respiration sensors that profiled the user's physical conditions.
- 2015–2017 **Bioengineering Professional**, *BIOS (Center for Bioinformatics)*, Manizales, Colombia
Implemented custom hardware-software interfaces for large-scale displays using body-worn devices. Supported an applied research project on automated quality control with computer vision algorithms.

Education

- 2019–2023 **PhD. Computer and Systems Sciences**, *Stockholm University*, Stockholm, Sweden
Department of Computer and Systems Sciences (DSV).
DISSERTATION: User Modeling for Adaptive Virtual Reality Environments 🔗.
Personalization from behavioral and physiological time series.
- 2017–2019 **MSc. Health Informatics**, *Karolinska Institutet*, Stockholm, Sweden
Department of Learning, Informatics, Management and Ethics (LIME).
DISSERTATION: Facilitating Technology-based Mental Health Interventions with Mobile Virtual Reality and Wearable Smartwatches. 🔗 *Heart Rate Variability Analysis in Slow-Breathing Exercises.*

- 2010–2015 **BSc. Electronics Engineering**, *National University (UNAL)*, Manizales, Colombia
GPA: 4.4/5.0 — Ranked 3rd among graduated students, and top-best in national engineering exam.
Emphasis on signal processing, hardware programming, control theory, and telecommunications.
- 2009–2010 **Associate Degree on Computer Systems**, *Unitécnica*, Manizales, Colombia
Principles of computer systems, web development, databases and software/hardware configuration.

Teaching

- 2020–2023 **Teaching Assistant**, *Stockholm University*, Stockholm, Sweden
Lab tutor in the following courses for students at Master's level:
- *Data Mining with Python* for the course DAMI (2020II, 2021II, 2022II, 2023II).
8 hours of lectures and Q&A sessions. 150-230 students each cohort.
 - *Introduction to Data Mining* for the course DSHI (2021I, 2022I, 2023I).
12 hours of lectures and Q&A sessions. 40-60 students each cohort.
 - *Building Virtual Reality Applications with Unity* for the course DET (2020I, 2021I, 2022I, 2023I).
6 hours of lectures and hands-on labs. 10-15 students each cohort.
- Spring 2016 **Lecturer**, *Caldas University*, Manizales, Colombia
Course leader for undergraduate students in the program Mechatronics Engineering:
- *Microprocessors architecture* (2016I). 19 students. 64 hours of lectures.
- Spring 2016 **Lecturer**, *Unitécnica*, Manizales, Colombia
Course leader for students in vocational training for Computer Systems and Visual design:
- *App development with Unity* (2016I). 17 students. 48 hours of lectures.
 - *Introduction to Databases* (2016I). 14 students. 24 hours of lectures.
- 2012-2014 **Undergraduate Teaching Assistant**, *National University*, Manizales, Colombia
Lab assistant for undergraduate students in the program Electronics Engineering:
- *Dynamic Systems and Control* (2012II, 2013I). 50 students. 16 hours of labs each cohort.
 - *Communication Systems* (2014II). 30 students. 16 hours of labs.

Qualifications & Skills

- Languages English (C1 —IELTS= 7.0), Spanish (Native), Swedish (Limited), Portuguese (Limited).
- Programming C#, C++, Python, MatLab, \LaTeX .
- Frameworks Unity, OpenXR, Scikit-Learn, OpenCV, Qt.
- Hardware Meta Quest, Vive VR headsets, Polar ECG, Myo EMG, Emotiv EEG, embedded systems.
- Research Academic writing, teaching, data science, systems development, electronics, HCI.

Publications

Research Projects

Complete description of my research projects is on my personal website [!\[\]\(de95854c7ee024cfadc48187bbb781b2_img.jpg\)](#).

Complete list of publications available on my Google Scholar [!\[\]\(3211b5d1d968fc1665909b34f9f16010_img.jpg\)](#).

Dissertations

- [1] **Quintero, L.** 2023c. "User Modeling for Adaptive Virtual Reality Experiences: Personalization from Behavioral and Physiological Time Series". PhD thesis. Stockholm, Sweden: Stockholm University, Department of Computer and Systems Sciences. 84 pp.
- [2] **Quintero, L.** 2019a. "Facilitating Technology-based Mental Health Interventions with Mobile Virtual Reality and Wearable Smartwatches". Master's Thesis. Stockholm University. 61 pp.

Journal Articles

- [1] Gnacek, M. **Quintero, L.** et al. Jan. 25, 2024. "AVDOS-VR: Affective Video Database with Physiological Signals and Continuous Ratings Collected Remotely in VR". In: *Scientific Data* 11.1, p. 132.
- [2] **Quintero, L.**, Fors, U., and Papapetrou, P. 2023b. "Personalized feature importance ranking for affect recognition from behavioral and physiological data". In: *IEEE Transactions on Games*, pp. 1–10.
- [3] Muñoz, J. E. **Quintero, L.** et al. Apr. 16, 2020. "A Psychophysiological Model of Firearms Training in Police Officers: A Virtual Reality Experiment for Biocybernetic Adaptation". In: *Frontiers in Psychology* 11 (April), pp. 1–14.
- [4] i Badia, S. B. **Quintero, L.** et al. 2019d. "Toward Emotionally Adaptive Virtual Reality for Mental Health Applications". In: *IEEE Journal of Biomedical and Health Informatics* 23.5, pp. 1877–1887.

Conference Proceedings

- [1] Ekman, J., Solsona, J., and **Quintero, L.** June 2024. "Codeseum: Learning Introductory Programming Concepts through Virtual Reality Puzzles". In: *ACM International Conference on Interactive Media Experiences*. IMX '24. ACM, pp. 192–200.
- [2] Dodieva, M. and **Quintero, L.** Dec. 2, 2024. "Comparing Early-Stage Symptoms of Spatial Disorientation Between Virtual Reality Navigation and Paper-Based MoCA Test". In: *Proceedings of the International Conference on Mobile and Ubiquitous Multimedia*. MUM '24. New York, NY, USA: Association for Computing Machinery, pp. 445–447.
- [3] Ulrichs, J., Matvienko, A., and **Quintero, L.** Dec. 2, 2024. "Effects of Third-Person Locomotion Techniques on Sense of Embodiment in Virtual Reality". In: *Proceedings of the International Conference on Mobile and Ubiquitous Multimedia*. MUM '24. New York, NY, USA: Association for Computing Machinery, pp. 72–81.
- [4] Stepanova, E. R., [...], **Quintero, L.**, et al. Dec. 2, 2024. "Envisioning Ubiquitous Biosignal Interaction with Multimedia". In: *Proceedings of the International Conference on Mobile and Ubiquitous Multimedia*. MUM '24. New York, NY, USA: Association for Computing Machinery, pp. 495–500.
- [5] Bernsland, M., [...], **Quintero, L.**, et al. 2022a. "CS:NO – an Extended Reality Experience for Cyber Security Education". In: *ACM International Conference on Interactive Media Experiences*. Series Title: IMX '22. Aveiro, Portugal, pp. 287–292.
- [6] **Quintero, L.** et al. 2022b. "Excite-O-Meter : an Open-Source Unity Plugin to Analyze Heart Activity and Movement Trajectories in Custom VR Environments". In: *IEEE Conference on Virtual Reality and 3D User Interfaces - Abstracts and Workshops (VRW)*, pp. 46–47.
- [7] **Quintero, L.** et al. 2021a. "Effective Classification of Head Motion Trajectories in Virtual Reality using Time-Series Methods". In: *IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR)*. Tsinghua, Taiwan, pp. 38–46.
- [8] **Quintero, L.** et al. 2021b. "Excite-O-Meter: Software Framework to Integrate Heart Activity in Virtual Reality". In: *IEEE International Symposium on Mixed and Augmented Reality (ISMAR)*. Bari, Italy, pp. 357–366.
- [9] Muñoz, J. E. **Quintero, L.** et al. 2021c. "Taxonomy of Physiologically Adaptive Systems and Design Framework". In: *Adaptive Instructional Systems. Design and Evaluation. HCII 2021. Lecture Notes in Computer Science*. Vol. 12792 LNCS. ISSN: 16113349, pp. 559–576.
- [10] **Quintero, L.** 2020b. "Understanding Research Methodologies when Combining Virtual Reality Technology with Machine Learning Techniques". In: *13th ACM International Conference on Pervasive Technologies Related to Assistive Environments (PETRA)*. Corfu: ACM Press, pp. 209–212.
- [11] **Quintero, L.** et al. 2019b. "Implementation of mobile-based real-time heart rate variability detection for personalized healthcare". In: *IEEE International Conference on Data Mining Workshops, ICDMW*. Vol. 2019-Novem. ISSN: 23759259. IEEE, pp. 838–846.

- [12] **Quintero, L.**, Papapetrou, P., and Munoz, J. E. 2019c. "Open-Source Physiological Computing Framework using Heart Rate Variability in Mobile Virtual Reality Applications". In: *IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR)*. IEEE, pp. 126–133.
- [13] Muñoz, J. E., Pope, A. T., and **Quintero, L.** 2016. "Integrating Biocybernetic Adaptation in Virtual Reality Training Concentration and Calmness in Target Shooting". In: *Physiological Computing Systems*. Springer International Publishing, pp. 218–237.

Books/Reports

- [1] European Commission et al. 2023a. *Extended reality : opportunities, success stories and challenges (health, education)*. Publications Office of the European Union. 202 pp.

--- Supervision & Advising

Main supervisor in Master's Theses

- 2025 *Aurelia Maria Ozora*: Exploring Expert Perspectives on Designing an Augmented Reality (AR) Exergame for Dementia Patients. MSc. Health Informatics, Karolinska Institutet.
Shweta Prasad Ghaisas: The Role of Interactivity and Realism in Virtual Reality in Shaping Emotional Responses Towards Individuals with Autism Spectrum Disorder. MSc. Health Informatics, Karolinska Institutet.
Yin Shea Lai: The application of Virtual Reality (VR) in dental education: A user's perspective. MSc. Health Informatics, Karolinska Institutet.
Nicklas Bourelius: Designing Immersive Tools for Exposure Therapy: Expert-Guided Development of VR/MR Apps for Acrophobia. MSc. Design for Immersive Technologies, DSV, Stockholm U.
Negin Soltani: Comparing Interaction Methods for Activating Conversational AI Assistants in Virtual Reality. MSc. Design for Immersive Technologies, DSV, Stockholm U.
Zeinab Bagheri Fard: Enhancing Industrial Training through Situated Visualization in Augmented Reality. MSc. Design for Immersive Technologies, DSV, Stockholm U.
Lucas Alhnäs, Elias Bennaceur: Hands-On Audio: Exploring spatial audio and handtracking. BSc. Digital Media, DSV, Stockholm U.
- 2024 *Maria Dodieva*: Early detection of Alzheimer disease with the VR City Navigation game. MSc. Design for Immersive Technologies, DSV, Stockholm U.
Johanna Ulrichs: The Virtual Body and Locomotion - Comparing the Effects of Different Locomotion Techniques on Embodiment and User Experience in Third Person Virtual Reality. MSc. Design for Immersive Technologies, DSV, Stockholm U.
Elias Lundahl: Evaluating the impact of passthrough for XR-based meditation experiences. MSc. Design for Immersive Technologies, DSV, Stockholm U.
Hoda Ismail: Exploring the Impact of Virtual Environment Factors on Stress Reduction in VR Meditation. MSc. Design for Immersive Technologies, DSV, Stockholm U.
Aufar Tirta Firdaus: Explainable AI for Emotion Recognition: Interpreting Cardiovascular Data in Virtual Reality Users. MSc. Health Informatics, Karolinska Institutet.
- 2023 *Helén Han*: Treatment Adherence in Digital Psychotherapy - Using Machine Learning to Predict Patient No-shows. MSc. Health Informatics, Karolinska Institutet.
Fan Zhang: Exploring the requirements for the design of virtual reality serious games to support people with dementia. MSc. Health Informatics, Karolinska Institutet.

Mi Zhang: Exploring how virtual material appearance with control-display ratio drives the weight perception in VR within two-handed hand tracking input. MSc. Design for Immersive Technologies, DSV, Stockholm U.

Johan Ekman: Comparing engagement of VR and non-VR games for programming learning purposes. MSc. Design for Immersive Technologies, DSV, Stockholm U.

Co-supervisor in Master's Theses

2025 *Kent Fredriksson*: Interactive Explanations in Clinical Decision Support: A Comparative Study of Exploratory and Explanatory XUIs for Clinical Prediction Models. MSc. Health Informatics, Karolinska Institutet. Main Superv.: Alejandro Kuratomi

2024 *Dogu Ziyin Uyar*: Evaluating User's Spatial Learning in Photo-Realistic Virtual Environments during Navigational Tasks in Extended Reality. MSc. Design for Immersive Technologies, DSV, Stockholm U. Main Superv.: Jordi Solsona

Siyue Lu: Facilitating Location-Based Mixed Reality: The Applicability, Benefits, and Challenges of 5G Positioning. MSc. Design for Immersive Technologies, DSV, Stockholm U. Main Superv.: Jordi Solsona

2022 *Daniel Schulze*: Explainability of personalized stress detection models from wearable-collectible physiological data. MSc. Health Informatics, Karolinska Institutet. Main Superv.: Jaakko Hollmén

Divya Damodaran: Machine Learning for prediction of start and termination of Freezing of Gait in Parkinson's Disease. MSc. Health Informatics, Karolinska Institutet. MS: Jaakko Hollmén

Yujie Xiang: Understanding Heart Rate Responses to Detect Emotional Valence Using Interpretable Machine Learning. MSc. Health Informatics, Karolinska Institutet. MS: Jaakko Hollmén

2021 *Dana Kokey*. Towards detecting arousal level from heart rate information in virtual reality 360-degree videos. MSc. Health Informatics, Karolinska Institutet. MS: Panagiotis Papapetrou

Alborz Alipour. Outlier Detection in Stock Market Prediction through Anomaly Detection. MSc. Computer and Systems Sciences, Stockholm University. MS: Sindri Magnússon

Samiha Nalwooga. Knowledge distillation for building accurate plant classification models for mobile devices. MSc. Computer and Systems Sciences, Stockholm U. MS: Sindri Magnússon

Mawada Hamad. The trade-off between performance and compression rate when applying knowledge distillation. MSc. Computer and Systems Sciences, Stockholm U. MS: Sindri Magnússon

Ali Mussayab. Design requirements for Recruiting Contingent Café Baristas with Immersive Virtual Reality Simulations. MSc. Design for Immersive Technologies, Stockholm U. MS: Robert Ramberg

Interns Supervision

2025 *Nackademin*: 20-weeks internship from two LIA students developing a VR escape room using hand-based interactions. Published on the Meta Store.

2024 *Vladimir Guillemont*: 12-week internship developing a Django dashboard for data visualization in Python.

Teaching Activities

2025 **Design for Emerging Technologies, 7.5 Credits**, (Course Responsible)

The course challenges the students to apply and discuss key concepts, methods, and tools that facilitate interaction supported by immersive technologies (XR:VR/MR/AR).

Data Science for Health/Design, 7.5 Credits, (Course Responsible)

The course introduces the data-analytical process required for data science projects. It presents algorithms and techniques with focus on application areas such as health informatics and interaction design.

Honors

Research Grants

2023–2026 **Wallenberg Foundation** , 4.5MSEK, Project Member

Let us talk about non-verbal communication: Investigation of interpersonal psychotherapeutic interactions and their effect on treatment outcomes using AI and time series analysis.


Industrial Funding

2022–2023 **Fondo Emprender** , 20kEUR, Project Leader


Seed funding to startup the company PortalSense in Manizales (Colombia), which develops architectural virtual reality visualization for real estate and public infrastructure projects.

Scholarships

Summer 2022 Donation scholarship for research activities, awarded by Stockholm University 

2017–2019 Scholarship for Master's studies in Sweden, awarded by the Swedish Institute 

2013–2015 Grant for tuition fees during undergraduate program, by Roberto Rocca Foundation 

Winter 2014 Grant for top undergraduate students to visit China, by Seeds for the future Huawei 

2009–2010 Scholarship for vocational training in computer systems, granted by a private company.

Academic Awards

2015 Ranked 3rd in GPA among undergraduate students - National University of Colombia

2012 Best robot design and programming - VEX Robotics Competition

2009 Ranked 1st among high-school students

Professional Service

Reviewer

Journals

2025 Scientific Reports, *Nature Springer*

2022 Data Mining and Knowledge Discovery, *Springer*

2022 International Journal of Human-Computer Interaction, *Tandford*

2019 Journal of Granular Computing, *Springer*

Conferences

2025 ACM CHIWORK, ACM CUI, ECML-PKDD

2024 IEEE AIxVR

2023 IEEE ACII, IEEE AIxVR

2021 IEEE VR, IEEE AIxVR

2019 IEEE AIxVR

Service

Proc. Chair ACM CHIWORK 2025: Symposium on Human-Computer Interaction for Work

ACM MUM 2024: International Conference on Mobile and Ubiquitous Multimedia

Demo Chair ACM IMX 2024: International Conference on Interactive Media Experiences

Invited Talks and Panels






Sep 2023 **Invited lecturer**, *Umeå Institute of Design*, Umeå, Sweden
Prototyping Virtual Reality Applications in Unity

- June 2023 **Invited lecturer**, *RUAV*, Cali, Colombia
Introduction to Data Analytics and Artificial Intelligence
- Feb 2023 **Research visit**, *DIS group at CWI*, Amsterdam, Netherlands
User Modeling for Adaptive Virtual Reality Environments
- Sep 2021 **Invited panelist**, *Conference EUROSIS GAME-ON*, Portugal, (virtual)
The Use of Digital Games and AI for Health and Wellbeing
- Oct 2020 **Invited Interview**, *Podcast Immersive Learning Network*, USA, (virtual)
Discussing methodological aspects of combining machine learning in virtual reality research.

Associations & Memberships

- 2022-2023 Chair of the PhD Council at DSV, Stockholm University.
- 2021-ongoing Member of XRCOL: Colombian Association for Immersive, Interactive, and Emerging Tech.
- 2019-ongoing Member of SANC: Sweden Alumni Network Colombia - SI Leadership Network.

Press & Blog Articles

- Apr 2024 **The Conversation UK**: Wearable devices will collect a mountain of information on us .
- Dec 2023 **SU Blog**: The real game-changer is when regular glasses become smart (SWE) .
- Feb 2023 **EU Commission**: XR - Opportunities and Challenges in Health and Education .
- May 2022 **SU Blog**: Time-series analysis for behavioural user modelling in VR .
- May 2019 **CFC Blog**: Visit a new construction project in virtual reality (SPA) .

Certifications & Achievements

IRL Courses

- 2023 **Medical Time Series Mining**, *VAIA - KU Leuven*, Belgium, 16h.
- 2022 **Entrepreneurial Storytelling**, *SSES*, Sweden, 16h.
- 2022 **Summer school: AI and Games**, *Modl.ai*, Greece, 40h.
- 2019 **Introduction to Teaching**, *Stockholm University*, Sweden, 80h.
- 2018 **Building Innovation Strategies**, *School of Entrepreneurship*, Sweden, 16h.
- 2016 **Scientific Computing**, *ICT Ministry*, Colombia, 120h.
- 2016 **Exploring Physiological Data for Interactive Apps**, *BIOS*, Colombia, 16h.
- 2016 **Fundraising: Tools and Methodologies for Financing Projects**, *BIOS*, Colombia, 16h.
- 2011 **Computer Maintenance**, *Unitécnica*, Colombia, 120h.
- 2009 **Electrical Installations**, *SENA*, Colombia, 900h.
- 2007 **Certificate in English Language**, *Colombo-American Center*, Colombia, 640h.

MOOCs

- 2016 **A System View of Communications**, by *Hong Kong UST* in *EdX*, (3 terms).
- 2015 **Project Management for Professionals**, by *IADB* in *EdX*.
- 2015 **Computation Structures: Digital Circuits**, by *MIT* in *EdX*.
- 2014 **Introduction to Computer Programming**, by *IIT Bombay* in *EdX*.
- 2014 **Fundamentals of Electrical Engineering**, by *Rice University* in *Coursera*.
- 2013 **Beginning Game Programming with C#**, by *University of Colorado* in *Coursera*.