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Luis Quintero

PhD Scholar, Stockholm University

Research Interests

Behavioral analysis in interactive environments
Virtual reality (VR) and extended reality (XR)
Machine learning for time-series data
Physiological and physical measurements with wearable sensors

Employment

- 2019–present **Doctoral Researcher**, *Stockholm University*, Stockholm, Sweden
Department of Computer and Systems Sciences, (DSV). Member of the Data Science Group [🔗](#).
Conducted research on behavioral user modeling in VR environments, detecting emotional states and other human factors from wearable sensors' data using algorithms for time series classification.
- 2018–present **Founder/Developer**, *PortalSense*, Manizales, Colombia
Created a startup in interactive architectural visualization for VR headsets. Responsible for the design, development of applications for real estate projects and public showcases [🔗](#).
- 2017–2019 **Consultant/Developer**, *Independent*, 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**, *ITI (Interactive Technologies Institute)*, Madeira, Portugal
Developed several frameworks in Unity to support projects for mental and physical well-being. Programmed communication interfaces with multiple body-worn sensors for health interventions.
- 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–present **PhD. Computer and Systems Sciences**, *Stockholm University*, Stockholm, Sweden
Department of Computer and Systems Sciences (DSV).
Preliminary Dissertation Title: User Modeling from Behavioral Time Series in Virtual Reality.
- 2017–2019 **MSc. Health Informatics**, *Karolinska Institutet*, Stockholm, Sweden
Department of Learning, Informatics, Management and Ethics (LIME).
Dissertation Title: Facilitating Technology-based Mental Health Interventions with Mobile Virtual Reality and Wearable Smartwatches.
- 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

- 2020–2022 **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. 140h/year.
- *Introduction to Data Mining* for the course DSHI. 75h/year.
- *Building Virtual Reality applications with Unity* for the course DET. 20h/year.
- Spring 2016 **Instructor**, *Caldas University*, Manizales, Colombia
Course leader for 19 undergraduate students in: *Microprocessors architecture*. 64h.
- Spring 2016 **Instructor**, *Unitécnica*, Manizales, Colombia
Course leader in: *App development with Unity*, 70h. *Introduction to Databases*. 40h.
- 2012-2014 **Undergraduate Teaching Assistant**, *National University*, Manizales, Colombia
Lab tutor for undergraduate students in the courses:
- *Dynamic Systems and Control*. (Autumn 2012, Spring 2013). 64h/term.
- *Communication Systems* (Autumn 2014). 64h.

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, hardware, HCI.

Publications

Complete list of publications available on my Google Scholar .

Dissertations

- [1] **Quintero, L.** 2019a. "Facilitating Technology-based Mental Health Interventions with Mobile Virtual Reality and Wearable Smartwatches". MSc. Stockholm University, pp. 1–61.

Journal Articles

- [1] Muñoz, J. E. **Quintero, L.** et al. Apr. 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.
- [2] 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] 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*. IMX '22. Aveiro, Portugal, pp. 287–292.
- [2] **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.
- [3] **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.

- [4] **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.
- [5] 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, pp. 559–576.
- [6] **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.
- [7] **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. IEEE, pp. 838–846.
- [8] **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.
- [9] 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.




Supervision & Advising

Master’s Theses Co-supervision

- 2022 *Daniel Schulze*: Explainability of personalized stress detection models from wearable-collectible physiological data. MSc. Health Informatics, Karolinska Institutet. Main Superv.: Jaakko Hollmén
- 2022 *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
- 2022 *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
- 2021 *Alborz Alipour*. Outlier Detection in Stock Market Prediction through Anomaly Detection. MSc. Computer and Systems Sciences, Stockholm University. MS: Sindri Magnússon
- 2021 *Samiha Nalwooga*. Knowledge distillation for building accurate plant classification models for mobile devices. MSc. Computer and Systems Sciences, Stockholm U. MS: Sindri Magnússon
- 2021 *Mawada Hamad*. The trade-off between performance and compression rate when applying knowledge distillation. MSc. Computer and Systems Sciences, Stockholm U. MS: Sindri Magnússon
- 2021 *Ali Mussayab*. Design requirements for Recruiting Contingent Café Baristas with Immersive Virtual Reality Simulations. MSc. Design for Immersive Technologies, Stockholm U. MS: Robert Ramberg

Honors

Grants & Scholarships

- Summer 2022 Donation scholarship for research activities during PhD, awarded by Stockholm University.
- 2022–2023 Seed funding for the startup PortalSense, granted by Colombian government.
- 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 Activities

Research Projects

The complete description of my research projects is on my personal website [🔗](#).

Reviewing Services

Reviewer for Conference Proceedings

- IEEE Virtual Reality (VR)
- IEEE Artificial Intelligence and Virtual Reality (AIVR)

Reviewer for Journal Articles

- Springer: Data Mining and Knowledge Discovery, 2022
- Tandford: International Journal of Human-Computer Interaction, 2022
- Springer: Granular Computing, 2019

Program Committee Member

- IEEE Artificial Intelligence and Virtual Reality (AIVR), 2020–2022

Invited Talks and Panels

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 Representative of PhD Council at DSV, Stockholm University.

2021-2022 Member of XRCOL: Colombian Association for Immersive, Interactive, and Emerging Tech.

2019-2022 Member of SANC: Sweden Alumni Network Colombia - SI Leadership Network.

Press & Blog Articles

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** [🔗](#).

Certifications & Achievements

IRL Courses

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*.