

Alejandro Rey López



HCI Research | WebDev | GameDev (XR)

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SUMMARY

HCI researcher, last-year PhD candidate at Universidad Carlos III de Madrid and developer. Currently, I am **about to defend my thesis on Embodiment and Multisensory interfaces** applied to data analytics (Multisensory Immersive Analytics).

Development – I have designed and developed **immersive serious games** targeted at learning and/or scientific dissemination. Additionally, I have experience carrying out VR (but also desktop) usability studies, implementing data visualization interfaces as well as I/O tangible prototypes for immersive systems. Regarding web development, I have **professional experience developing full-stack applications**. Oriented to research, I have developed **research support tools powered by web technologies** (e.g., websockets), along with integration with third-party APIs (e.g., Spotify, INE) to use in the web directly or be consumed by Unity applications.

Teaching, dissemination and university work – As a **professor**, I have taught several programming courses, from basic programming (Matlab and Python) to more advanced topics such as web and game development. I have participated in scientific dissemination programs such as *#uc3mEnTuAula* and *T3chfest*, bringing VR, data-visualization and the metaverse closer to the general public. Moreover, I have **supervised a large number of bachelor theses** related to both web and game development during my period as a lecturer at university (mostly involving Immersive Technologies and/or Data Visualization).

📖 PUBLISHED WORK

- Alejandro Rey. **Exploring Embodiment and Multisensory Codification for Immersive Analytics**. PhD Thesis, Universidad Carlos III de Madrid (2026; Submitted, waiting for defense).
- Alejandro Rey, Diego Navas. **Act on the present and peek into the past: A system for Asynchronous Immersive Analytics Collaboration**. In Proceedings of the 2026 International Conference on Advanced Visual Interfaces (**AVI 2026**).
- Alejandro Rey, Andrea Bellucci, Paloma Díaz, and Ignacio Aedo. **The more the better? Multi-sensory redundant mappings to convey information in abstract visualizations**. **Virtual Reality** 29, 176 (2025).
- Alejandro Rey, Andrea Bellucci, Paloma Díaz, and Ignacio Aedo. **The Effect of Teleporting versus Room-scale Walking for Interacting with Immersive Visualizations**. In: Abdelnour Nocera, J., Kristín Lárusdóttir, M., Petrie, H., Piccinno, A., Winckler, M. (eds) Human-Computer Interaction (**INTERACT 2023**). Lecture Notes in Computer Science, vol 14143.

- Alejandro Rey, Andrea Bellucci, Paloma Díaz, and Ignacio Aedo. **IXCI: The Immersive eXperimenter Control Interface**. In Proceedings of the 2022 International Conference on Advanced Visual Interfaces (**AVI 2022**). Association for Computing Machinery, New York, NY, USA, Article 64, 1–3.
- Alejandro Rey, Andrea Bellucci, Paloma Díaz, and Ignacio Aedo. 2021. **A Tool for Monitoring and Controlling Standalone Immersive HCI Experiments**. In Adjunct Proceedings of the 34th Annual ACM Symposium on User Interface Software and Technology (**UIST '21 Adjunct**). Association for Computing Machinery, New York, NY, USA, 20–22.
- Telmo Zarraonandia, Paloma Díaz, Alejandro Rey, Ignacio Aedo, and Teresa Onorati. 2021. **Investigating Augmented Reality Educational Games for Head-Mounted Devices**. In Proceedings of the XXI International Conference on Human Computer Interaction (**Interacción '21**). Association for Computing Machinery, New York, NY, USA, Article 7, 1–6.



PROFESSIONAL EXPERIENCE

Predoctoral researcher at Carlos III University

UC3M, DEI Interactive Systems Group



Madrid, Spain

September 2020 - ongoing (part-time)

Multisensory Virtual Reality research, involving designing and programming interactive immersive systems using game engines. Development of tangible interface prototypes for VR applications. Web and game development activities related to data visualization and analysis.

Some of the (publicly available) software I have developed during this period are *IXCI: The eXperiment Control Interface* and *inestat.com*.

Fullstack developer

EspacioSOA.SL

Madrid, Spain

November 2024 - November 2025

- **Fullstack and integration application development:** Development of an Android-first augmented reality application for measuring 5G connectivity in indoor spaces and visualizing the saved measurements on top of web-based map interface (see *InMap*). Involved three modules:
 - (1) **Android application development** using Java and Kotlin with Jetpack compose for the UI development. The application makes uses of a local database to save the measurements before sharing them through the network. Backend development for storing the measurements in a server using Javascript and NodeJS, and MongoDB.
 - (2) Development of a **fullstack web application** to explore measurements and display them over interactive maps using Vanilla Javascript and self-deployed REST APIs.
 - (3) Development of measurement application that communicates via Serial Port with a cell connectivity module (**Quectel RM520N-GL**) mounted on a **Raspberry Pi** that allows extracting information regarding the cell signal quality through AT commands. The application provides users with an interface that allows sending the measured data to the backend server to link both the Android measurements and the Pi measurements with a given measured Room in order to perform correction.
- **MunchFit website:** Frontend development with React+NextJS for the support website of the app using React. Redesign of the website and implementation of a simulation of application functionality to allow an advanced preview of the functionality (e.g., explore nutritional plans and configure them interactively). Implemented localization to 3 languages and semi-automated deployment and testing. Then, I created a custom calendar slot manager in the internal management website so that employees and external nutritionists could specify their availability (what hours they could take clients) with fine granularity.
- **Android Kotlin development:** Support in developing the *MunchFit* application. My tasks were mainly interface components development with Jetpack Compose and refactoring of legacy code to

migrate to Kotlin.

Freelance work

- **NGO internal management site** (2025): User management application developed for [Mundo Justo](#) to optimize their processes and keep track of the use of their facilities. Developed fully in Typescript (front and back), React and native CSS styles, no libraries. It features some complex non-tabular data structures and uses MongoDB for storage. With this project I learnt a lot about streamlining deployment.
- **Romancero Interactivo - Luis Rius** (2026): Web version of a [poetry book](#) whose poems take place in my hometown, Tarancón. My father turned the poems into songs and this project brings both the poems and songs into the same realm. This project was meant to serve as advertising for the book and contribute to my hometown's heritage. I designed the website inspired by the book and implemented a custom audio player that streams the songs from the backend.

Research Assistant at Carlos III University

UC3M, DEI Interactive Systems Group



Madrid, Spain

September 2019 - July 2020

- **Project:** Development of an Augmented Reality video-game targeted at raising awareness about gene-editing and new plant breeding techniques (NPBTs). Collaboration with the [CHIC project](#).
- **Tasks & Skills:** Design and implementation (as solo developer) of an agriculture video-game using Unity, targeting Hololens 1. The objective of the game is to battle the broad misinformation regarding new breeding techniques and genetically modified products by presenting the basic advantages and implications in a straightforward way. Gardening and improving your own infrastructure and products through various means, among which we find gene-editing, allows the user to intuitively discern advantages and disadvantages of each one of these methods.

Frontend Developer at Open Summer of Code

Open Summer of Code, Ontology Engineering Group UPM



Madrid, Spain

July 2019 - August 2019

- **Project:** Design and implementation of a web interface to support a NLP (Natural Language Processing System) which analysed and provided summaries of relevant events within legal judgements to produce a timeline which makes it easier to explore such formal documents for experts and general users alike. The project was linked to [Lynx](#), an European project targeted at creating a Legal Knowledge Graph to ease multilingual law compliance.
- **Tasks & Skills:** Implementation of a graph based, visualisation system by means of web technologies (HTML, SVG, Javascript and CSS3) to support interactive exploration of terms and events within legal documents.

Salesforce Developer Internships at Everis

Enterprise and Cloud Solutions department, Everis Spain



Madrid, Spain

December 2017 - July 2018

- **Project:** Development of tailored applications based on the Salesforce platform for a home insurance company; handling CRM-related functionality (Customer Relationship Management) and System integration.
- **Tasks & Skills:** Web Service programming and microservices integration, using SOAP(Simple Object Access Protocol) and REST (Representational State Transfer) to exchange information between subsystems. Languages: Apex, SOQL, Visualforce.

Internship at COE Leganés (UC3M)

Centro de Orientación al Estudiante, UC3M



January 2016- January 2017

- **Tasks & Skills:** Development and maintenance of webpages through the use of ASP/JSP. Installation and configuration of various software required by the office. Maintenance of Linux and Windows servers. Database Maintenance associated to the ESES service. Maintenance of inventory of computers all around campus and support to the Information Center at University.



TEACHING EXPERIENCE

Programming courses

More than 180 teaching hours



Madrid, Spain

2020-2023

- **Matlab Programming, *Degree in Applied Mathematics and Computing (English)***
Basic programming course which covers the fundamentals of imperative and structured programming using Matlab. The course covers the very basics of computers and programming, as well as more advanced topics such as data structures, error control, I/O and recursion. 
- **Python Programming, *Degree in Mechanical Engineering***
The course focused on computational thinking and algorithm design using flow charts, which were later translated to Python. Students were introduced to basic data structures and algorithms (e.g., lists, dictionaries). 
- **Web development, *Degree in Computer Science (English)***
Advanced programming course that guides students through the process of implementing a fully functional website using web technologies (Javascript, HTML, CSS) and Java. The course is focused on back-end development and server-side rendering, using relational and non-relational databases to provide users with dynamic content. The course covered topics such as web-services, architectural patterns and HTTP-based protocols such as SOAP and REST, used everywhere nowadays.  

Supervised projects (Bachelor theses)

I supervised a total of 20 dissertations, below I list only research-oriented highlights



Madrid, Spain

2020-2025

- *Development of a asynchronous collaboration environment for data visualization in Virtual Reality* – Diego Navas Sánchez. 2025.
- *Stats for everyone: Web application for the democratization of data from INE (Instituto Nacional de Estadística)* – Enrique Benvenuto Navarro. 2024.
- *Development of a Mixed Reality application with tangibles.* – Hodei Urigoitia Merodio. 2022.
- *Development of a roguelike multiplayer videogame* – Álvaro Morata Hontanaya. 2024.
- *DIY Wearable haptic vest for virtual Reality Enviroments* – Isaac Buiza González. 2024.
- *Immersive Interface for monitoring remote sensors* – Carlos Saiz Blanco. 2024.



EDUCATION

M.Sc. in Computer Science and Technology

University Carlos III of Madrid; Major in Artificial Intelligence September 2019 - September 2020



Madrid, Spain

Last course GPA: 8.90/10,00 (2.79/4.00).

M.Sc. Thesis: *Affordance-based evaluation framework : physical, sensory, functional and cognitive affordances for AR interactive systems design*, graded with Distinction; 9.7/10.0.

Honours: Automated Programming, Advanced Security Network Systems, Engineering Methods for the development of multimedia and Web Systems.

B.Sc. in Computer Science and Engineering

uc3m Madrid, Spain

University Carlos III of Madrid; Minor in Computer Engineering; EUR-ACE Sept. 2014 - June 2019

Last Course GPA: 9.21/10,00 (3.00/4.00) with 96% of credits taken in English.

B.Sc. Thesis: *Development of an Augmented Reality Musical Instrument*, graded with Distinction; 9.4/10.00 (Full-text in English).

Honours: Computer Graphics, Computing technologies for the web, Ubiquitous Computing.



AWARDS

UC3M's BEST III Hackathon winner: First prize. Development of an algorithm to efficiently assign repairing resources (vehicles) to fix high voltage towers that got broken randomly over time. The development involved Javascript, HTML, CSS and the Google Maps API; so that real-world position values could be used via the web interface.



RELEVANT SKILLS

- **Videogame development and design:** over 5 years of experience in videogame development applying Computer Graphics concepts. Familiar with Unity, Blender (3D Modelling), Photoshop and Illustrator (UI and vector graphics design) for gamedev. Gameplay programming using C#.



- **Front-end design and development:** web user interface design and development professionally using HTML5, CSS3, SCSS and vanilla JavaScript and Typescript. Used to working with UI frameworks such as React to modularize code into components and doing CSR (Client Side Rendering). Familiar with Adobe Creative Cloud tools and Figma for interface design.



- **Back-end development:** deployment of web applications on Apache Tomcat Server, Apache2 Server and Glassfish/Payara, using Java Enterprise Edition. VPS configuration and load balancing configuration using NGINX. Development of web applications using NodeJS, and relational and non-relational databases (MySQL, PL/SQL and MongoDB). Familiar with REST APIs and integration. I have developed projects using not only HTTP(s) but also Websockets. Confident creating Unit tests with JEST.



- **Android development:** professional experience with Kotlin and Jetpack Compose for Android development. Contributed to the development of [Munchfit app](#) and developed [InMap](#) as solo developer.



- **Tangible interfaces and Internet of Things (IoT) Systems:** used in combination with Virtual Reality systems through web-based communication. Experience with Arduino based micro-controllers and a variety of sensors and actuators, leveraged throughout the years to develop prototypes (e.g., see [my bachelor thesis](#) or [InMap-Pi](#)). Recently I have been using it to create DIY multisensory stimulation systems during my PhD.



- **Qualitative and quantitative research skills (mainly HCI):** knowledge in user study design and systematic research methodologies and literature reviews. Over the years I have designed researchable questions, implemented functional prototypes to test those questions with participants, combining both quantitative analysis (e.g., questionnaires, interaction and performance metrics) and qualitative approaches (think-aloud, interviews, thematic analysis, design-thinking, *bodystorming*, etc.). Additionally, I have experience developing data analysis pipelines using python (e.g., numpy, pandas, matplotlib and seaborn) as well as computational notebooks (Google Colab) using real participant data. Strong academic writing skills in English and L^AT_EXuser.



LANGUAGES

 **English:** C1 Advanced

Research work in English, teaching at UC3M in English.

Bilingual Bachelor and Master; 96% of credits taught in English.

Student Exchange in Dublin; Cambridge certified 2012.

Professional experience as English Teacher at English LAB Academy (2019)

 **Italian:** B1

Conversational fluency.

Actively studying the language.

I lived in Italy for approximately 6 months.

 **Spanish:** Native Speaker level