

Alejandro Rey López



WebDev — GameDev — Research — Teaching

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SUMMARY

PhD candidate at Universidad Carlos III de Madrid and fullstack developer. B.Sc. in Computer Science (Bilingual) and M.Sc. in Computer Science and Technology. I do a lot of things all related to HCI, covering from web to virtual reality applications.

Currently I am finishing my PhD on Multisensory Virtual Reality applied to data analytics (Multisensory Immersive Analytics) and working as fullstack developer. As a **professor**, I have taught several programming courses, from basic programming (Matlab and Python) to more advanced topics such as web development and game development. I have participated in scientific dissemination programs such as *#uc3mEnTuAula* and *T3chfest*, bringing VR and the metaverse closer to the general public. I have designed and developed several **immersive serious games** targeted at learning and/or scientific dissemination. Additionally, I have experience carrying out VR 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** on both front and back ends. 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) to use in the web directly or consumed by Unity applications. 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.



PROFESSIONAL EXPERIENCE

Fullstack developer

EspacioSOA.SL

Madrid, Spain

November 2024 - ongoing

- **Android fullstack application development:** Development of an Android augmented reality application for measuring 5G connectivity in indoor spaces and visualizing the saved measurements on top of a map. **Android application development** using **Java and Kotlin** with Jetpack compose for the UI development. The application makes use 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.

Development of a **frontend** application to explore the measurement and display interactive maps using Vanilla Javascript and self-deployed REST APIs. 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 for the support website of the [MunchFit](#) 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).
- **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.

Predoctoral researcher at Carlos III University

UC3M, DEI Interactive Systems Group



Madrid, Spain

September 2020 - ongoing

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 products I have developed alone or contributed during this period are *IXCI: The eXperiment Control Interface* and *inestat.com*.

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 judgments 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

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.



RESEARCH WORK

- Alejandro Rey, Andrea Bellucci, Paloma Díaz, and Ignacio Aedo. **The more the better? Multisensory redundant mappings to convey information in abstract visualizations.** (In submission 2024).
- 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 Diaz, 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, 20–22.10.1145/3474349.3480217
- 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.



TEACHING EXPERIENCE



Programming courses

More than 180 teaching hours

uc3m

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)

(20 in total, showing highlights)

uc3m Madrid, Spain
2020-2025

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



EDUCATION

M.Sc. in Computer Science and Technology

uc3m Madrid, Spain

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

• **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 3 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 (Full Course via SkillShare), SCSS and vanilla JavaScript. Used to working with UI frameworks such as React to modularize code into components and doing CSR (Client Side Rendering)



- **Back-end design and development:** deployment of web applications on Apache Tomcat Server, Apache2 Server and Glassfish/Payara, using Java Enterprise Edition. 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 but also Websockets. Confident creating Unit tests with JEST.



- **Android development:** professional experience with Kotlin and Jetpack Compose for Android development.



- **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.



- **Research skills:** knowledge in user study design and systematic research methodologies. Experience with automated data analysis using python (numpy, pandas, matplotlib and seaborn). Academic writing skills in English and L^AT_EX user.



LANGUAGES

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- **Spanish:** Native Speaker
 - **English:** C1 Advanced
Conference speaker during my PhD.
Bilingual Bachelor; 4 years and 96% of credits taught in English.
Student Exchange in Dublin; Cambridge certified 2012.
English Teacher at English LAB Academy for a year (2019), Tarancón, Cuenca, Spain.
 - **Italian:** Basic speaking skills, good listening skills.