Francisco Díaz Barrancas

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Research Summary

I received the B.S degree in computer engineer in 2017 and the M.S degree in computer technologies research in 2018, both from the University of Extremadura (UEx), Mérida, Spain. I got my PhD with CUM LAUDE distinction and international mention in research related to light and color management in real-time rendering of 3D scenarios in March 2022 at the Centro Universitario de Mérida, Spain under the supervision of Dr. Pedro José Pardo Fernández. After my PhD, I was working at the Justus-Liebig University under the supervision of Prof. Karl Gegenfurtner as a PostDoc Researcher in the ERC project "Color 3.0: An object-oriented approach to color", working on user perception and color constancy in virtual reality devices. During this time my area of interest was hyperspectral images, color appearance and virtual reality, with a focus on applying perceptually-motivated solutions.

Currently, I am working on cybersecurity in virtual and augmented reality device communications at the University of Extremadura under a project in collaboration with INCIBE.

Education

Oct 2018-
March 2022 **Ph.D. in Computer Science**
Centro Universitario de Mérida, University of Extremadura, Spain, Advisor: Prof. Pedro Jóse Pardo.
-Thesis "Application of hyperspectral techniques to improve the visual appearance and sense of realism in virtual reality devices"
(Average grade: CUM LAUDE and international mention)

Sep 2017 -
Jun 2018 **Research Master in Computer Science (M.Sc.)**
Centro Universitario de Mérida, University of Extremadura, Spain, Advisor: Prof. Pedro Jóse Pardo.
-Thesis: "Study of reproduction chromatic fidelity in virtual reality devices"
(Average grade: 9.82/10)

Sep 2013 –
Jun 2017 **Bachelor degree in Computer Science (B.Sc.)**
Centro Universitario de Mérida, University of Extremadura, Spain, Advisor: Francisco Chávez de la O.
(Average grade: 7.86/10)

Research experiences

Jun 2024 – Dec 2025 **PostDoc Researcher at the Orion Group**
Centro Universitario de Mérida, University of Extremadura, Spain, Advisor: Prof. Pedro Jóse Pardo.

April 2022 – Abril 2024 **PostDoc Researcher at the Gegefurtner´s Lab**
Justus-Liebig Universität, Gießen, Hessen, Germany, Advisor: Prof. Karl Gegenfurtner.

Oct 2017 – March 2022 **Researcher at the Orion Group**
Centro Universitario de Mérida, University of Extremadura, Spain, Advisor: Prof. Pedro Jóse Pardo.

Research visiting

July 2023 July 2023 **ICVS Summer School 2023**
Color vision. Oxford University. (Oxford, UK).

Oct 2019 – Dec 2019 **PhD Stay at the MIPS Group**
Università Degli Studi di Milano (Milano, Italy). Advisor: Prof. Alessandro Rizzi.

Jun 2019 – Jun 2019 **Summer School Student (UBISS 2019)**
Oulu University (Oulu, Finland).

Publications

Journal publications

2024 **High-fidelity color characterization in virtual reality across head mounted displays, game engines, and materials**
Francisco Díaz-Barrancas*, Raquel Gil Rodríguez, Florian S. Bayer, Avi Aizenman and Karl R. Gegenfurtner
Optics Express. JCR Q2

2021 **Real-Time Application of Computer Graphics Improvement Techniques Using Hyperspectral Textures in a Virtual Reality System**
Francisco Díaz-Barrancas*, Halina Cwierz and Pedro J. Pardo
Electronics. JCR Q3

2021 **On the validity of virtual reality applications for professional use: A case study on color vision research and diagnosis**
Halina Cwierz, Francisco Diaz-Barrancas*, Julia Gil-Llinás, Pedro J. Pardo
IEEE Access. JCR Q2

2020 **Colour appearance in immersive three-dimensional virtual environments**
Francisco Díaz-Barrancas*, Halina Cwierz, Pedro J. Pardo, Ángel Luis Pérez and María Isabel Suero
Coloration Technology. JCR Q2

2020 **Spectral Color Management in Virtual Reality Scenes**
Francisco Díaz-Barrancas*, Halina Cwierz, Pedro J. Pardo, Ángel Luis Pérez and María Isabel Suero
Sensors. JCR Q1

Conferences

2024 **Training a Neural Network on Virtual Reality Devices: Challenges and Limitations.** Francisco Díaz-Barrancas*, Daniel Flores-Martin and Javier Berrocal.
IEEE VR 2024.

2023 **Color Calibration in Virtual Reality Using Different Head Mounted Displays**. Francisco Díaz-Barrancas*, Raquel Gil-Rodríguez, Avi Aizenman, Florian S. Bayer and Karl R. Gegenfurtner. Vision Science Society (VSS) 2023.

2023 **Color calibration in virtual reality for Unity and Unreal.** Francisco Díaz-Barrancas*, Raquel Gil-Rodríguez, Avi Aizenman, Florian S. Bayer and Karl R. Gegenfurtner. IEEE VR 2023.

2022 **Validating Perception of Hyperspectral Textures in Virtual Reality Systems.** Francisco Díaz-Barrancas*, Halina Cwierz, Raquel Gil-Rodríguez and Pedro J. Pardo. EuroVis 2022.

2022 **Validación de un Test de daltonismo en 3D y Realidad Virtual.** Halina Cwierz*, Francisco Díaz-Barrancas, Julia Gil Llinás, Pedro J Pardo. Congreso Nacional del Color 2022 (Spain).

2022 **Validación de una escena de Realidad Virtual aplicando mejoras hiperespectrales en el escenario.** Francisco Díaz-Barrancas*, Halina Cwierz and Pedro J. Pardo. Congreso Nacional del Color 2022 (Spain).

2021 **Color Constancy in virtual reality scenes. A first step toward a color appearance model in virtual reality**
Pedro J. Pardo, Francisco Díaz-Barrancas* and Halina Cwierz. AIC 2021

2021 **A study of physical and perceived linearity in a virtual reality environment**
Francisco Díaz-Barrancas*, Halina Cwierz and Pedro J. Pardo. AIC 2021

2020 **Application of spectral computing technics for color vision testing using virtual reality devices**
Halina Carmen Cwierz; Francisco Díaz Barrancas; Pedro José Pardo; Ángel Luis Pérez; María Isabel Suero. Electronic Imaging 2020

2020 **Visual fidelity improvement in virtual reality through spectral textures applied to lighting**
Francisco Díaz Barrancas; Halina Carmen Cwierz; Pedro José Pardo; Ángel Luis Pérez; María Isabel Suero. Electronic Imaging 2020

2019 **A virtual scene with conservation objects with different illuminants and colour management**
Francisco Díaz Barrancas; Halina Carmen Cwierz; Pedro José Pardo; Ángel Luis Pérez; María Isabel Suero. A Conservation Carol 2019

2019 **Aplicación de texturas hiperespectrales a objetos 3D en escenas de Realidad Virtual**
Francisco Díaz Barrancas; Halina Carmen Cwierz; Pedro José Pardo; Ángel Luis Pérez; María Isabel Suero. National Conference of Color 2019 (Spain)

2019 **Cómo realizar una correcta gestión del color en sistemas de realidad virtual**
Halina Carmen Cwierz; Francisco Díaz Barrancas; Pedro José Pardo; Ángel Luis Pérez; María Isabel Suero. National Conference of Color 2019 (Spain)

2019 **Herramienta para la valoración de la capacidad de discriminación del color de observadores normales y defectivos mediante un test de ordenación de color, reproducido en un entorno de realidad virtual**
Halina Carmen Cwierz; Francisco Díaz Barrancas; Pedro José Pardo; Ángel Luis Pérez; María Isabel Suero. National Conference of Color 2019 (Spain)

2019 **Reconstrucción de objetos 3D mediante técnicas SFM y obtención de texturas hiperespectrales**
Francisco Díaz Barrancas; Halina Carmen Cwierz; Pedro José Pardo; Ángel Luis Pérez; María Isabel Suero. National Conference of Color 2019 (Spain)

2019 **Hyperspectral textures for a better colour reproduction in virtual reality**
Francisco Díaz Barrancas; Halina Carmen Cwierz; Pedro José Pardo; Ángel Luis Pérez; María Isabel Suero. XV Conferenza del Colore 2019

2019 **Improvement of realism sensation in virtual reality scenes applying spectral and color management techniques**
Francisco Díaz Barrancas; Halina Cwierz; Pedro José Pardo; Ángel Luis Pérez; María Isabel Suero. International Colour Vision Society 2019

2019 **Validity of virtual-reality-based systems applied to lighting and colour rendering research**
Pedro José Pardo; Halina Cwierz; Francisco Díaz Barrancas; Ángel Luis Pérez; María Isabel Suero. International Colour Vision Society 2019

2018 **Colour Management in Virtual Reality applied to Lighting Simulations**
Halina Cwierz; Francisco Díaz Barrancas; Pedro José Pardo; Ángel Luis Pérez; María Isabel Suero. International Colour Association 2018

2018 **Is it possible to apply colour management technics in Virtual Reality devices?**
Francisco Díaz Barrancas; Pedro José Pardo; María Isabel Suero; Ángel Luis Pérez. XIV Conferenza del Colore 2018

Teaching

2020 **Programming Fundamentals**
Centro Universitario de Mérida, University of Extremadura, Spain.

2019, 2020 **Multimedia Communication System**
Centro Universitario de Mérida, University of Extremadura, Spain.

Funding & Awards

2019 **Santander SmartTalent Artificial Intelligence Finalist**
Santader Bank

2017 **Yuzz-Explorer Santander Bank Finalist**
Santader Bank

2017 **UGR Research Talent Recruitment**
University of Granada, Spain

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