(+34) 659 033 710

hecbarcab@gmail.com

Héctor Barreiro Cabrera

Ph.D. in Computer Science

Passionate about technology and computing. Specializing In Computer Graphics, I explore topics such as physics-based animation, haptic interaction, virtual reality and machine learning.

I was honored with the prize for the best doctoral thesis of the Spanish section of Eurographics at CEIG 2023, affirming my dedication to advancing computer graphics research.

PROFESSIONAL AND RESEARCH INTERESTS

- Physics-based animation
- Real-time rendering
- High-performance computing
- Machine learning
- Mixed reality (AR & VR)
- Haptic rendering

PUBLICATIONS

Aug. 2021 — **Soft-Tissue Simulation for Computational Planning of Orthognathic Surgery**
P. Alcañiz, J. Pérez, A. Gutiérrez, **H. Barreiro**, Á. Villalobos, D. Miraut, C. Illana, MA. Otaduy
Journal of Personalized Medicine

Jul. 2021 — **Natural Tactile Interaction with Virtual Clay**
H. Barreiro, J. Torres, MA. Otaduy
Proc. of World Haptics Conference, 2021

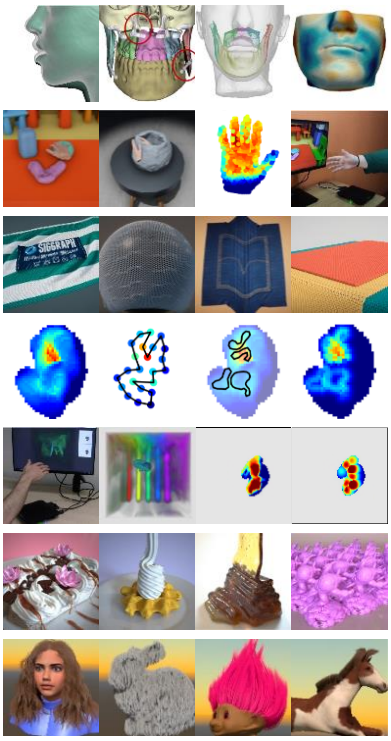
Jul. 2020 — **Robust Eulerian-on-Lagrangian Rods**
R.M. Sánchez-Banderas, A. Rodríguez, **H. Barreiro**, MA. Otaduy
ACM Trans. on Graphics (Proc. of ACM SIGGRAPH), Volume 39, Number 4 - 2020

Feb. 2020 — **Path Routing Optimization for STM Ultrasound Rendering**
H. Barreiro, S. Sinclair, MA. Otaduy
IEEE Trans Haptics. 2020 Feb 24. doi: 10.1109/TOH.2019.2963647.

Jul. 2019 — **Ultrasound Rendering of Tactile Interaction with Fluids**
H. Barreiro, S. Sinclair, MA. Otaduy
2019 IEEE World Haptics Conference (WHC). IEEE, 2019

Nov. 2017 — **Conformation Constraints for Efficient Viscoelastic Fluid Simulation**
H. Barreiro, I. García-Fernández, I. Alduán, MA. Otaduy
ACM Trans. on Graphics (Proc. of ACM SIGGRAPH Asia), 2017

Jul. 2015 — **Real-time Inextensible Hair with Volume and Shape**
R. M. Sánchez-Banderas, **H. Barreiro**, I. García-Fernández, M. Pérez Martínez
Congreso Español de Informática Gráfica, 2015



EDUCATION

Ph.D. in Computer Science
Higher School of Computer Engineering, Universidad Rey Juan Carlos, Spain
Sep. 2016 – Sep. 2021
Development of novel techniques for simulating physical phenomena and haptic rendering..
Supervised by **Prof. Miguel A. Otaduy.**

Master's Degree in Computer Graphics, Videogames and VR
Higher School of Computer Engineering, Universidad Rey Juan Carlos, Spain
Sep. 2015 – Jul. 2016
Covering diverse subjects such as rendering techniques, graphic processors, and physics-based simulation, as well as videogames and virtual reality.

Bachelor's Degree in Multimedia Engineering
Higher School of Engineering, Universitat de València, Spain
Sep. 2010 – Sep. 2015
Combines audiovisual communication with computer engineering, especially deepening in multimedia systems and all related areas (graphics, simulation, sound, ...).

COURSES & CERTIFICATES

Machine Learning
Stanford Online. @ Coursera

Neural Networks and Deep Learning
Deeplearning.ai @ Coursera

Improving Deep Neural Networks: Hyperparameter tuning
Deeplearning.ai @ Coursera

WORK EXPERIENCE

Senior Research Scientist
SEDDI Inc, Madrid, Spain
Jun 2022 – Today
Avatar generation pipelines using statistical models. Cloth mechanics simulation R&D.

Research Engineer
Meta Reality Labs Research, Redmond, USA
May 2021 – Apr 2022
Development of softbody simulation framework for AR/VR.

Research Intern
Meta Reality Labs Research, Redmond, USA
Aug. 2020 – Nov. 2020
Acceleration strategies for high-fidelity simulation methods.

Researcher
Universidad Rey Juan Carlos, Móstoles, Spain
Nov. 2015 – Apr. 2021
Constraint-based model for the simulation of extremely viscous and viscoelastic fluids. Haptic interaction models with virtual fluids.

Research Intern
Ultraleap Ltd, Bristol, UK
Feb. 2020 – Mar. 2020
Integration of the Handybeam acoustic simulator with MSLab's soft-body simulation framework.

Researcher
Next Limit Technologies, Madrid, Spain
Dec. 2017 – Sept. 2018
Research of fluid simulation methods and machine learning techniques. Funded by Spain's government under the *Doctorados Industriales* program (*ref. DI-16-08640*).

Junior Programmer
Instituto de robótica y tecnologías de la información y comunicación. Paterna, Spain
Oct. 2013 – Feb. 2015
Portuary machine simulators and interactive applications

PROFICIENCIES

Spanish: Native
English: B2*

* Without formal qualification, skill levels stipulated following the CEFR self-assessment table provided by the Instituto Cervantes.

PROGRAMMING LANGUAGES

C++, C#, Python

TOOLS OF CHOICE

IDE	Visual Studio, VS Code, Jupyter
Frameworks	Eigen, PyTorch, Numpy, Scipy, Sympy
Source control	Git, Mercurial
HPC	CUDA, OpenCL, DirectCompute
Game engines	Unity

For further information, please contact me or visit my online portfolio.

Thank you for your time