Héctor Barreiro Cabrera, Ph.D. in Computer Science

PORTFOLIO hecbarcab.github.io EMAIL hecbarcab@gmail.com GITHUB hecbarcab RESIDENCE Valencia, Spain

WORK EXPERIENCE

2022 – Now Senior Scientist — SEDDI Inc — C++, OpenGL, Python, PyTorch
- Implemented state-of-the-art methods to generate personalized avatars using statistical models.
- Refactored the avatar generation pipeline for maintainability while honoring best design practices.
- Optimized critical data structures to enable vectorization, resulting in up to 10x performance boost.
- Improved robustness and realism of real-time cloth simulation engine.

2021 – 2022 Research Engineer — Meta Reality Labs Research — C++, CUDA
- Implemented robust interactive soft-body simulation leveraging SIMD for superior performance.
- Added seamless support for CPU and GPU solvers through template metaprogramming.

2020 Research Intern — Meta Reality Labs Research — C++, CUDA
- Prototyped GPU-accelerated finite element analysis with significant boost over CPU baseline.

2015 – 2021 Student Researcher — Universidad Rey Juan Carlos — C++, C#, CUDA, Direct Compute, Unity
- Developed a novel constraint-based formulation for simulating viscous and viscoelastic fluids.
- Devised novel strategies for driving ultrasonic haptic devices for interacting with virtual fluids.
- Engaged in reading seminars to explore and discuss the advancements in computer graphics research.
- Collaborated on the production of papers and demos, ensuring to meet project deadlines.

2020 Research Intern — Ultraleap Ltd — C++, Python
- Integrated a model to predict the effects of ultrasonic focal points in virtual skin phantom.

2017 – 2018 Student Researcher — AnyVerse — Python
- Explored machine learning methods to infer the time evolution of fluid dynamic states.
- Funded by Spain's government under the *Doctorados Industriales* program *(ref. DI-16-08640)*.

2013 – 2015 Junior Programmer — IRTIC — C#, Unity
- Ported training simulator for cargo handling in port operations to Unity.
- Developed Augmented Reality interactive applications and demos using Unity and Vuforia.

EDUCATION

2016 – 2021 Ph.D. in Computer Science — Universidad Rey Juan Carlos
- Obtained **Best Doctoral Thesis Award** by the **Spanish Section of Eurographics**.

2015 – 2016 M.Sc. in CG, Videogames and VR — Universidad Rey Juan Carlos
- Rendering techniques, GPGPU, physics-based simulation, geometry processing, videogames, VR...

2010 – 2015 B.Sc. in Multimedia Engineering — Universitat de València
- Computer engineering & multimedia systems (graphics, simulation, sound, ...).

PUBLICATIONS

2021	Soft-Tissue Simulation for Comp. Planning of Orthognathic Surgery	Journal of Personalized Medicine, 2021
2021	Natural Tactile Interaction with Virtual Clay	IEEE World Haptics Conference, 2021
2020	Robust Eulerian-on-Lagrangian Rods	ACM Trans. on Graphics, 2020
2020	Path Routing Optimization for STM Ultrasound Rendering	IEEE Trans. on Haptics, 2020
2019	Ultrasound Rendering of Tactile Interaction with Fluids	IEEE World Haptics Conference, 2019
2017	Conformation Constraints for Efficient Viscoelastic Fluid Simulation	ACM Trans. on Graphics, 2017
2015	Real-time Inextensible Hair with Volume and Shape	CEIG, 2015

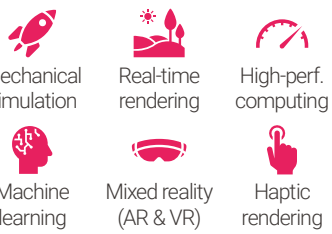
CERTIFICATIONS

Machine Learning
Stanford Online @ Coursera

Neural Networks and Deep Learning
Deeplearning.ai @ Coursera

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

PROFESSIONAL INTERESTS



OTHER SKILLS AND PERSONAL INTERESTS

Tools	Visual Studio, VS Code
Frameworks	Eigen, PyTorch, Numpy, Sympy
HPC	CUDA, OpenCL, OpenGL, GLSL, HLSL
Game Engines	Unity, Godot
Hobbies & Interests	Single player videogames, travelling, trying out new food, comedy shows, petting dogs, naps

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

Thank you for your time