



DAVID GARCIA TEJEDA

Computer Graphics and GPU Programming
cybernexus.cat — technical blog and portfolio

CONTACT

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-  cybernexus.cat

EDUCATION

Degree in Computer Engineering

2019 - 2024

Polytechnic University of Catalonia

FIB Computing Major

Master in Innovation and Research in Informatics (MIRI)

2024 - 2026

Polytechnic University of Catalonia

Advanced Computing specialization

LANGUAGES

Spanish

Mother tongue

Catalan

English (B2 Certificate)

2018

Issued by Cambridge

OTHERS

Driving license B

2021

Availability to work remotely

Immediate incorporation

Ability to adapt to any schedule

TECHNICAL COMPETENCES

Programming languages:

- Proficient with **C/C++**, **Java**, **Javascript/Typescript**, **Python** and **MATLAB**
- Scripting with **Bash** and **Linux** system administration
- Development with **Prolog** and basic knowledge of **Haskell**

Computer graphics and GPU:

- **Vulkan** (graphics and compute), **OpenGL 4.3**, **WebGL2** and **GLSL**
- GPGPU applications with **CUDA**, **OpenCL**, **OpenGL GPGPU**, **OpenMP** and **OpenACC**
- Hand-written rendering engines, ray tracing, radiosity, voxelization and **PBR**
- **Diligent Engine**, **three.js**, **LibGDX** and **Dear ImGui**

Web Programming:

- Frontend with **HTML**, **CSS**, **Javascript**, **Vue.js** and **VuePress**
- Backend with **PHP** and **Node.js**; static site generators **Hugo** and **Jekyll**
- Databases **SQL**, **PostgreSQL** and **SQLite**
- Compilation to **WebAssembly** with **Emscripten** and **TeaVM**

Frameworks and tools:

- Sockets in C and C++ with **Boost ASIO** and the **UNIX Socket** interface
- Desktop applications with **Qt** and **Java Swing**; **Android Studio**
- **Git**, **CMake**, **Gradle**, **GIMP**, **Blender**, **Markdown** and **LaTeX**
- Collaborative robotics **UR** and **PIC** microcontrollers

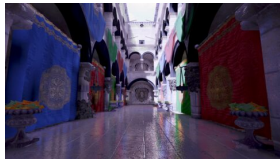
PERSONAL SKILLS AND ABILITIES

I have the ability to be self-taught and to solve problems that require unconventional and/or innovative solutions. I am also able to work independently.

In my free time I develop free software that I publish in my Github repositories and document on my blog, cybernexus.cat, where I write technical articles about computer graphics, GPU programming and systems. I have the ability to work in a team and learn new technologies.

WEB PORTFOLIO: CYBERNEXUS.CAT

On cybernexus.cat I document every project in detail: the approach, the technical decisions, the code and the measured results. Several articles include interactive demos and playable builds compiled to WebAssembly that run directly in the browser. Every project on this page has a full write-up there.



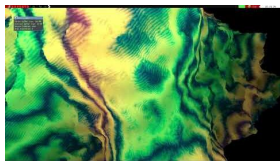
Immediate Radiosity

2025 - 2026

Master's Thesis (MIRI, UPC)

Real-time global illumination. Form factors are precomputed by ray marching a voxelization of the scene and stored as a sparse matrix, so per-frame GI reduces to a single sparse matrix-vector product dispatched on the GPU. Includes a custom specular writeback path (SD*). Implemented entirely with Vulkan compute shaders.

cybernexus.cat/academic/immediateradiosity.html



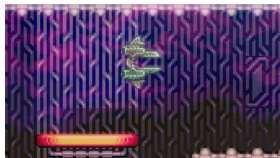
Parallel voxelization of 3D surfaces

2024

Bachelor's Thesis (FIB, UPC)

Voxelization engine built on top of Diligent Engine. Benchmarks four storage models (2D grid, 3D grid, octree and cached octree) and a multithreaded voxelization algorithm using per-thread memory pools to avoid race conditions. Near-linear speedup, holding above 70% efficiency at 8 threads.

cybernexus.cat/academic/voxelengine.html



Joc and the Shambhala engine

2022 - 2026

University project, ported to WebAssembly

A horizontal shoot-'em-up on top of Shambhala, a roughly 4,000 line OpenGL 4.3 engine written from scratch: resource system, component system, material system, its own render chain and a Dear ImGui level editor. Recompiled to WebAssembly and WebGL2 with Emscripten, playable in the browser.

cybernexus.cat/posts/joc.html



Detramotor: GPU particle system

2024

Personal project, Vulkan rendering engine

Particle system with all data resident on the GPU and simulated with compute shaders, so the CPU never touches an individual particle. Includes a CPU fallback path for when manual control over emission is needed.

cybernexus.cat/posts/cgpuemitter.html



Detravisualizer

2023

Research tool, graph visualization

3D visualizer for power-law networks in the millions of nodes. The Treecapitator algorithm places nodes in reverse degree order to avoid the central-clutter problem of conventional layout algorithms. Written in C++ and OpenGL.

cybernexus.cat/academic/detravisualizer.html



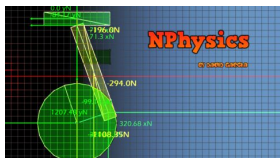
Shaderpaper

2023

Personal project, Linux

A native equivalent to Wallpaper Engine for Linux: runs GLSL fragment shaders as live animated desktop wallpapers, integrated at the X11 compositor level and compatible with Shadertoy uniforms.

cybernexus.cat/academic/shaderpaper.html



NPhysics

2018

High school research project

Dynamics simulator that solves user-defined statics problems by binary searching over a real physics simulation with JBox2D. Supports joints, motors, springs, pulleys and water simulation, all inside an interactive graphical environment. Java and LibGDX.

cybernexus.cat/academic/nphysics.html