

# TIAGO JOSÉ SOUSA MAGALHÃES

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## HIGHLIGHTED PROJECTS & EXPERIENCE

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### Summary

- 5 years of experience in Univerity and 2 years of professional experience for a total of 7 years of experience working with C/C++ and Linux
- Specialized in low-level high-efficiency systems programming with a Master's degree in Software Engineering

### Software Systems Engineer at BOLD

April 2022 - Present

- Employed by BOLD and subcontracted to Critical Techworks a subsidiary of BMW. I integrate a team responsible for maintaining the Linux OS and several proprietary software layers. As a part of this team, my fundamental responsibilities involve:
  - Debug & Fix bugs submitted by testing teams, or redirect them to the correct team.
  - Design & Develop features within the AUTOSAR framework in C++.
  - Communicate with external vendors and suppliers with the goal of developing hardware and software corrections and features.

### Software Systems Engineer at BOLD

November 2021 - March 2022

- Employed by BOLD and subcontracted to Bosch Thermotechnology's software excellence team. I integrate a team that develops tools used by other teams to achieve their goals. As a part of this team, my various functions include:
  - Development of a custom embedded Linux distribution using the Yocto build system.
  - Development of Linux kernel modules and drivers for the Raspberry Pi.
  - Supporting other teams by developing C/C++ code that they can use to fully leverage existing hardware.
  - Supporting in improving existing C/C++ software and bringing it up to date.

### Software Systems Engineer at BOLD

November 2020 - November 2021

- Employed by BOLD and subcontracted to Efacec's platform team in the R&D Division as a software systems engineer. As a part of this team, my various functions include:
  - Worked with C/C++, bash scripting, Python and Yocto/Poky Linux.
  - Development, feature backporting, and, Maintenance of the operating system kernel used in Efacec's products. This includes the base Linux kernel and any required hardware drivers.
  - Development, porting, and, Maintenance of software packages to be used in the operating system distribution used in Efacec's products.
  - Research and development of optimized software solutions for the needs of Efacec's products and clients' needs.
  - Supporting other product development teams with developing solutions specialized for the various types of hardware used in Efacec's products.

### Real-Time Ray Traced Voxel Global Illumination

- My master's dissertation proposes a technique to be used in real-time computer graphics that mixes hardware-accelerated ray tracing with voxelization techniques already used in rasterized computer graphics. This technique aims to achieve a balance between performance and graphical fidelity.
  - Completely decouples ray-tracing resolution from video output resolution.

- The presented solution utilizes a 3-stage pipeline: rasterized-based surface voxelization, ray-traced radiance injection, and final image synthesis.
- Briefly investigated the option of building the ray-tracing BVH acceleration structure based on the results of the voxelization stage, however, between transferring data from the GPU to the CPU and intersection performance, this approach was discarded early in development.
- Implemented a resource descriptor memory allocator which attempts to minimize stalls from locks in multi-threaded scenarios.
- Implemented using a fully custom rendering engine written in C++17 using the DirectX 12 rendering API and the Windows API. This engine is my own creation, except for the usage of tinyobjloader for model loading and Dear ImGui for a debug interface.
- Debugged using mainly the Nvidia Nsight Graphics debugger and the visual studio C++ debugger.
- Utilizes a CMake-based build system.

## TECHNICAL SKILLS

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<b>Programming Languages</b>	C++, C, x86 Assembly, ARM Assembly, C#, Java
<b>Scripting Languages</b>	Python, Bash
<b>IDEs</b>	Neovim, Visual Studio, JetBrains Suite, 4coder
<b>Profilers</b>	CodeXL, Intel VTune, NVidia Nsight Graphics & Compute
<b>Database Management Systems</b>	PostgreSQL, SQLite, MS SQL Server, MongoDB
<b>CI/CD Platforms</b>	Gitlab CI, Circle CI, Jenkins
<b>Notable APIs</b>	DirectX 12, OpenGL, WINAPI, POSIX

## LANGUAGES

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<b>Portuguese</b>	Native
<b>English</b>	C2 Level (Unofficial)

## EDUCATION

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<b>University of Porto - Faculty of Engineering (FEUP)</b>	<i>September 2016 - July 2020</i>
Integrated Master's Degree	
Computation and Informatics Engineering (Software Engineering) - Dissertation Final Mark: 18/20	
<b>Polytechnic of Porto - School of Engineering (ISEP)</b>	<i>September 2015 - September 2016</i>
Bachelor's Degree	
Computer and Electrical Engineering	
At the end of the 1 <sup>st</sup> year, I transferred to FEUP's software engineering degree.	