

# Orlando Aguilar Vivanco

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## SUMMARY

Programmer with expertise in image processing, computer graphics and game development. Leader and designer in several roles of programming projects. Fast prototyping, and also attentive to details, works well with deadlines, hardworking, responsible and loves researching.

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## SKILLS

**Programming languages:** C/C++, Java, GLSL, Lua, C#, Javascript, HLSL (in order of familiarity)

**Software:** Visual Studio, Unreal 4, Unity, Git, Matlab, Eclipse, Blender, Gimp 2

**API:** OpenGL, STL, SDL, OpenCV 3, Windows API, FMOD, CUDA, Chipmunk Physics, Qt 4, WebGL, Windows Phone SDK, Android SDK, DirectX

**Others:** Computer Graphics, Image processing, 3D Geometry and Math, GPU architecture, Oculus VR, Physics, AI

**Languages:** Spanish, English

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## SCHOOL PROJECTS

### Graphics Engine (C++, OpenGL 4.5, DirectX 11)

Spring 2015

- Developed a Deferred System able to draw thousands of point lights using instancing, and directional lights that cast shadows, which were generated using the Exponential Shadow Map technique
- Implemented Screen Space Ambient Occlusion smoothed by Bilateral Filter based on the paper Alchemy (2011)
- Implemented a Microfacet BRDF Image Based Lighting technique using HDR during the calculations and a Montecarlo integrator for specular reflections
- Implemented Glare effect and HDR tone Mapping from the paper Real Time HDR Rendering (2007)
- Implemented skinning algorithms for animating articulated models using interpolation techniques such as SLERP, iSLERP, iLERP and other variants implemented with VQS (Vector, Quaternion, Scalar) for more efficient calculations and memory usage
- Developed a simulation with deformable objects using spring theory and Newtonian Physics
- Implemented Inverse Kinematics in real time using Cyclic Coordinate Descent Algorithm with constraints
- Developed a System to generate interpolated paths for traveling of characters using custom velocity during trajectory

### A little Bit (C++, OpenGL, LUA, Oculus, WinGDI, STL)

Spring 2015

First person puzzle game using VR (Team of 5)

- Designed a Scripting System using LUA which supports automatic reload of scripts in real time accelerating development of game, prototyping time and compilation
- Integrated Oculus C++ SDK and designed the communication between the graphics System and the Oculus device
- Designed a hardware accelerated particle system using Geometry and Compute Shader achieving better performance than with other techniques such as instancing rendering
- Developed the Windows System and the Input management using plain WinGDI
- Designed 8 Puzzles that were playable using Oculus without any problem for more than 70% of the testers

### AI Project (C++)

Spring 2014

- Designed and implemented algorithms to digitalize hand-drawn maps which were used in path finding, using techniques such as Otsu, Zhang and Suen, polygonal approximation and local thresholding
- Implemented JPS+, an algorithm 2-50 times faster than A\* for path finding
- Implemented Terrain analysis techniques such as Openness closest walls, Openness Rear Cover, Visibility, Rear cover with high visibility and Path finding with fog of war

### Game Engine (OpenGL, SDL, C++)

Spring 2014

- Developed a Factory system and a Resource Manager which took care of memory management
- Developed an impulse based 2D physics engine
- Designed an archetype system which was able to load the archetypes from txt files

- Developed a Sound Engine using FMOD
- Developed a Graphic System using modern OpenGL

## Automatic Nanotube's Mesurer (Matlab, Java)

Spring 2012

Software and algorithms for automatically measuring nanotubes

- Designed and implemented an algorithm for solving overlaps of nanotubes in segmented digital images
- Designed and implemented automatic algorithms for measuring thickness and longitude of nanotubes, based on thinning algorithms, with an accuracy of 90-97% compared to expert measurements

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## Personal and Professional projects

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### Orly (Unity, C#, Accelerometer, Touch screen)

Spring 2014

2D puzzle platform (published in Google Play)

- Designed a system of Input through accelerometer and touch screen that became the main game mechanic
- Integrated several APIs in order to allow interaction with Facebook and TapJoy
- Designed and developed 30 levels during the 4 months of the development of the game

### SimiBot® (C++, QT 4, Irrlicht, CSL, Bullet physics)

Fall 2012

3D Robot Simulator developed during internship (Team of 3)

- Designed multi dockable UI, with 3D rendering using QT 4
- Programmed PUMA dynamics and cinematics for simulation that matched the expected results on real time
- Applied a multithreaded design based on messages improving responsiveness of application
- Designed part of the documentation of the project such as SRS, SDD and testing documents achieving a project that satisfied the expectations of the client in 95%

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## ACHIEVEMENTS

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Published Article in **IEEE** "Characterization of Nanotube Structures Using Digital-Segmented Images"

Nov 2014

Winner in Exposoftware 4 times: VII, VIII, IX and X; a University Contest in Mexico

2008-2011

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## EDUCATION

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### M. S. in Computer Sciences

DigiPen Institute of Technology

May 2016

GPA 3.97

### Engineer in Electronic and Computer Sciences

Universidad de Guadalajara  
(Mexico)

2013

Specialization in Image Processing

Overall average 99.27% / 100%

### Windows Phone 8 certified

App University

2013

### Videogames for Windows 8, a Microsoft Learning Workshop

App University

2013

### Oracle Certified Professional, Java SE 6 Programmer

Oracle University

2011

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