Johan Ospina

Engineer looking for opportunities to work on challenging 3D, CV, and complex problems

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Education

M.S.E Computer Science / Princeton University — Sept 2019 - May 2021

GPA: 3.72 – *Teaching Assistant, Fully Funded GEM University Fellow*

- *Focus on 3D **Computer Vision**, **Graphics**, and **Algorithm Design***

B.S Computer Engineering / Boston University — Sept 2013 - May 2017

GPA: 3.65 – *Magna Cum Laude, Research Assistant, Teaching Assistant, Academic Conduct Committee*

- Featured by ECE Department for acquiring ***Microsoft Garage*** as Senior Design Project Client.

Skills

- **Languages:** C++, C#, JavaScript, Python, CSS, HTML, Bash, GLSL, Swift, LaTeX, Typescript
- **Technologies:** Unity, Git, ReactJS, BabylonJS, OpenCV, ThreeJS, LITElement, Redux, Scenekit, OpenGL, CMake, Docker, CI/CD pipelines, Mocha Chai tests, Angular, Pytorch, Jupyter Notebooks, Google Collab, CUDA, NodeJS, NPM, ES6, JSX
- **Math and Algorithms:** Optimization Techniques (LM, Newton's Method, Linear Programming), Randomized Algorithms, Linear Algebra, High Dimensional Geometry.
- **Domain Knowledge**
  - **Software Design:** Data structures, Design Patterns, Agile. Github + GitLab.
  - **Interactive / Visualization / Data Driven Applications:** Mixed Reality, Computer Vision, Computer Graphics, 3D Printing, Machine Learning, Neural Networks.
  - **Electronics:** Microcontrollers, Soldering, Simple Logic Design

Work Experience

Senior Prototyping & Computer Vision Tools Engineer / PTC - Vuforia — June 2021 – Present

Worked on a nimble team to create a viable prototype for a long term spatial digital twin effort.

- **Validation Team**:
  - Used graph theory to manipulate a data structure of 3D locations and data in a Unity C# application as well as a ThreeJS, application.
  - Productionized a JavaScript (LITElement, Redux, ThreeJS Typescript) library for 3D rendering useful for providing common services to 3D applications.
  - Created 3D Manipulation Tools from scratch to be used in a 3D Viewer using understanding of Graphics Pipeline and Projective Geometry.
- **Computer Vision Tools**:
  - Worked on tools to provide data to algorithms for visual **SLAM** systems and other **Machine Learning** Systems
  - Led architecture efforts for reworking a legacy codebase to meet new business needs.
  - Optimized 3D renderers for e57 point clouds and glTF mesh models.
  - Improved developer efficiency by adding formatting rules and other CI/CD systems.

R & D Software Engineer II / Wayfair LLC — June 2017 – Aug 2019

Ideated on and developed experiences with emerging technology ranging from short-term prototypes for internal stakeholders to researching longer-term initiatives. Usually this meant organizing my own work and executing on it without much external supervision.

- Projects:
  - Wayfair AR View in Room 3D
    - Interfaced mobile apps with 3D model database as well as wrote logic to place 3D models within Augmented Reality experience.
  - Real-time Material Conversion Pipeline
    - Took loosely defined requirements for V-Ray to PBR material conversion and updated 3ds Max scripts to increase accuracy of previous Material Conversions
  - Dollhouse Projection Mapping System
    - Led the creation of a self-contained projection mapping system that allowed users to move dollhouse size pieces of 3D printed furniture while optically tracking and projecting their patterns accordingly.
    - **Published at CHI EA '20:** https://dl.acm.org/doi/10.1145/3334480.3383180
  - Magic Leap Wayfair AR Web Experience
    - Wrote and Styled a ReactJS Web App shown in Mixed Reality

Research Assistant / Princeton University: Visual Learning Lab — Dec 2019 – May 2021

- Worked on Structure from Motion Problems with a Machine Learning Lens. Used statistical methods to improve accuracy of image matches.
- Created UI to allow users to mark their own images and derive the camera intrinsic parameters for each view. Implemented Self Calibration algorithms from scratch in Python.

Teaching Experience

Teaching Assistant / Princeton University & Boston University — Sept 2015 – May 2021

- COS 126: introduction to computer science (PU, 4 semesters)
  - Taught unsupervised and prepared materials, graded assignments
- EK 100: First year course for Incoming Engineers (BU)
- EC 327: Introduction to Software Engineering (BU)
  - Taught unsupervised and prepared materials, graded assignments
- EC 311: Introduction to Logic Design (BU)

Activities & Honors & Extras

- Grand Prize at MIT Reality Virtually Hack 2017
- Gold Edison Award for Wayfair AR feature
- Work Published at CHI EA '20 conference
- Best Machine Learning Hack at Wayfair Hacks
- Workshop Speaker at BU/MIT/Wayfair
- **Languages:** French, Spanish, Basic German