Jose Omar Betancourt

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EDUCATION

Ph.D. in Mechanical Engineering Expected: December 2025
University of California, Berkeley
Designated Emphasis in ***Computation & Data Science & Engineering***

Master of Science in Mechanical Engineering Graduated: December 2022
University of California, Berkeley

Bachelor of Science in Mechanical Engineering Graduated: May 2020
Minor: Applied Mathematics
Boise State University, Boise, ID

TECHNICAL SKILLS

- C++, MATLAB, Numerical Methods, Physics Modeling
- Data Visualization & Analysis, LaTeX, Genomic Optimization
- Bilingual in Spanish and English

RELEVANT EXPERIENCE

PhD Student, *Multiphysics Simulation & Optimization Lab* **Fall 2020 – Present**
University of California, Berkeley, Department of Mechanical Engineering

- **Developed voxel-based methods** to simulate thermochemical and mechanical processes in **woven composite materials** during hypersonic re-entry, identifying **failure mechanisms** and improving material performance in aerospace applications.
- Designed agent-based models using **C++, MATLAB, and Python** for drone mapping and aerial drop simulations, optimizing flight paths, payload distribution, and autonomous navigation.
- **Optimized reduced-order multiphysics models** with **genetic algorithms**, improving model efficiency and for coupled thermomechanical and fluid dynamics processes.
- Head Graduate Student Instructor for *Intro to Finite Element Methods* and *Modeling & Simulation of Advanced Manufacturing Processes* graduate courses.

Research Technician, *Microwave Vacuum Electron Devices Lab* **Fall 2018 – Spring 2020**
Boise State University, College of Engineering, Department of Electrical & Computer Engineering

- Project: *Development of Phase-Controlled Magnetron*
- **Fabricated fixtures** using turning lathes and **CNC** machines to streamline the wafer dye testing process.
- **Designed components** made from Low Temperature Co-Fired Ceramic (LTCC) using **SolidWorks**, ensuring precision in product development.
- Drafted and updated **reports and procedures** for assembly and fabrication processes, maintaining clear documentation for manufacturing.

Mechanical Engineering Intern, *L3 Technologies - Electron Devices* **Summer 2017 & 2018**

- Investigated alternative thermal interface materials to improve heat dissipation in microwave power modules, leading to a **15% temperature decrease** and proposing design changes.
- **Conducted experiments** evaluating performance, cost, and ease of application/removal of materials, providing data-driven recommendations.
- Utilized geometric dimensioning and tolerancing (GD&T) to create 3D solid models and 2D engineering drawings for precise manufacturing specifications.
- Used **SolidWorks** to perform **finite element analysis (FEA)**, validating experimental results through simulation.
- **Coordinated with vendors** to compare material costs and performance, informing the selection process for optimal solutions.

Relevant Graduate Coursework

Machine Learning Tools for Energy Transport · Finite Element Methods · Modeling & Simulation of Advanced Manufacturing Processes · Applications of Parallel Computers · Continuum Mechanics · Numerical Solutions to ODEs/PDEs · Model Predictive Control · Failure Analysis of Structural Materials