EDER MEDINA

COMPUTATIONAL SCIENTIST | ENGINEENERING SCIENTIST

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I am a combination of a mechanical engineering and applied mathematician. I specialize in scientific computing applied to nonlinear mechanics problems. The majority of my time is spent writing code to solve large optimization problems, exploring numerous solutions in nonlinear PDEs, and carrying out physical experiments.

Education

Aug 2016 – present

PhD Candidate in Engineering Science, SM (2020) @ Harvard University

I work on the computational design of the next generation of mechanical metamaterials. Specifically, I work on large scale PDE-constrained optimization and on the analysis of nonlinear mechanical systems to design multifunctional structures. This research has made me an expert in computational mechanics and numerical analysis.

Aug 2012 – May 2016

BSc Mechanical Engineering @ University of Texas-Austin

Computational Science Certificate, Mathematics Minor

During my undergraduate research project, I used Matlab and Mathematica to analyze time series data. Specifically, I analyzed sonomicrometry crystal embedded in bovine myocardium to better understand the effects and progression of heart attacks on left ventricle structure.

Programming Skills

Python

I have thorough knowledge of the Python ecosystem including scientific computing(Numpy, Numba, Scipy), data analysis and visualization (pandas, matplotlib, paraview/vtk,openCV), large scale simulations(petsc4py, mpi4py)

Machine Learning

I am comfortable with modern machine learning tool kits Jax, Pytorch, Tensorflow, scikit-learn. I am also familiar with probabilistic machine learning.

Additional Software Developement skills

I am confomfortable with programming in C/C++, Linux, git, and modern software developement workflows and I have contributed to opensource software (dolfin-adjoint/fireshape)

Other Skills & Interests

- Strong communication skills
- Data Visualization
- Rapid prototyping and additive manufacturing
- Experience with CAD
- Strong applied mathematics background
- Experimental physics
- Languages: English (native), Spanish (native)

Additional Education

- **Summer School** @ Simula Summer 2021 — Simula summer school for computational physiology. Study the effects of fiber dispersion in different heart tissue constitutive models.
- **Winter School** @ NECSI Winter 2020 — New England Complex Systems Institute. Developed an agent based model to simulate locust swarms
- **REU** @ Stanford Summer 2014 — Leadership Alliance Summer Early Identification Program Farhat lab. Automatic Differentiation in FEM drawbacks and implementation
- **Summer Course** @ ODTU Summer 2013 — Energy Conversion Systems program in Ankara, Turkey.
- **Spring Course** @ Delft TU Summer 2013 — Concepts of Nuclear and Radiation Technology Program.