

Daniel Oropeza

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EDUCATION

Massachusetts Institute of Technology

Cambridge, MA

- Pursuing Ph.D. in Mechanical Engineering, est. graduation August 2021
Major: Manufacturing Minor: Management

GPA: 5.00/5.00

- NASA Space Technology Research Fellow – 2017 Cohort
- Sloan Scholar, Alfred P. Sloan Foundation's Minority Ph.D. Program – 2016 Cohort

Research Focus: Synthesis and additive manufacturing of ceramic and magnetic materials for applications in hypersonic thermal management, electric machines, and spacecraft structures

Stanford University

Stanford, CA

- M.S. in Aerospace Engineering, January 2014

GPA: 4.00/4.00

Research Focus: Design, fabrication, and characterization of piezoelectric transducers and application to structural health monitoring of laminate composite structures

The University of Texas at Austin

Austin, TX

- B.S. in Aerospace Engineering with Highest Honors, May 2012

GPA: 3.98/4.00

Research Focus: Performance characterization of metals at high temperatures used in electromagnetic railguns

RESEARCH & WORK EXPERIENCE

09/16-Present **Mechanosynthesis Group (MIT)**

PhD Candidate – Advisor: Prof. John Hart

Cambridge, MA

- Exploring fundamentals of binder jet additive manufacturing process through design and fabrication of custom powder spreading and inkjet-based equipment for freeform fabrication of metal and ceramic parts
 - Studying influence of powder characteristics and spreading parameters on the formation of dense and uniform powder beds to improve part density and properties
 - Developing novel binder compositions to enable non-polymer-based binder jet AM for increased part density, reduced warping, and multi-material processing
- Performing synthesis and characterization of low work-function ceramic material for novel thermionic energy concepts, with application to aircraft thermal management and spacecraft propulsion
 - Developed first-order, MATLAB-based hypersonic model to simulate the effect of material properties on possible hypersonic flight profiles
 - Built inert environment furnace equipment and created procedure for synthesis of ceramic material
 - Led funded proposal (\$250,000) for additive manufacturing of ceramic materials; present project update to sponsor's corporate and technical leadership on a yearly basis

06/19-08/19 **NASA Jet Propulsion Laboratory**

Visiting Researcher – Mentor: Dr. Doug Hofmann

Pasadena, CA

- Proved feasibility of producing high strength aluminum welds, overlays, and 3D printed components from nanoparticle-enhanced weld wire, laying foundation for use in fabrication of structural spacecraft components

05/18-08/18 **NASA Glenn Research Center**

Visiting Researcher – Mentors: Michael Halbig, Dr. Jay Singh

Cleveland, OH

- Demonstrated control of magnetic properties of soft magnetic materials processed via binder jet additive manufacturing through manipulation of part porosity via thermal processing, in support of research program for electric motor component design for aircraft propulsion

04/14-07/16 **Lockheed Martin NEXT Team**

Research Engineer

Bethesda, MD

- Guided and managed international proposals and projects to test manufacturability of ceramic-metal composite via powder injection molding for use in aircraft thermal management

- Initiated cross-business area study for process and part qualification of metal components fabricated via additive manufacturing (selective laser melting) by identifying correlation of non-destructive evaluation tests (CT) and mechanical properties
- Led study and presented recommendations to senior, cross-business leadership on organization and initiatives to evolve culture of innovation throughout the company

09/12-12/13 **Structures and Composites Laboratory (Stanford University)**

Research Assistant – Advisor: Prof. Fu-Kuo Chang

Stanford, CA

- Proved superiority of structural health monitoring sensor in high-temperature environment by conducting signal strength and damage detection tests for BSPT and APC sensors
- Conducted preliminary design of multi-functional structural battery for electric vehicle application; prepared proposal for \$3 million ARPA-E award and presentations for BMW, GM, and partner companies

TEACHING & MENTORING EXPERIENCE

Graduate Diversity Ambassador – Fall 2017-Present

Cambridge, MA

- Support MIT Office of Graduate Education Diversity Initiatives through participation in Grad Catalyst seminars, MIT Summer Research Program application reviews, and Converge workshop

Undergraduate Research Mentor – Fall 2018-Present

Cambridge, MA

- Direct mentor to undergraduate students in MIT’s Undergraduate Research Opportunities Program; helping to set research goals, providing equipment training, technical advice and research mentorship

Big Brother Big Sister of Massachusetts Bay – Fall 2016-Fall 2017

Cambridge, MA

- Volunteered as “big brother” to middle school student

Project Lead the Way – Fall 2015-Spring 2016

Washington, D.C.

- Engaged as industry speaker, student mentor, and point of contact between Lockheed Martin and McKinley Tech High School; mentored two students for senior engineering project

PUBLICATIONS AND PRESENTATIONS

D. Oropeza, D.C. Hofmann, K. Williams, S. Firdosy, P. Bordeenithikasem, M. Sokoluk, M. Liese, J. Liu, X. Li. “Welding and Additive Manufacturing with Nanoparticle-Enhanced Aluminum 7075 Wire.” *J. of Alloys and Compounds* (2020).

D. Oropeza, S. Geng, M. Halbig, A.J. Hart, M. Singh. “Binder Jetting of Soft Magnetic Materials for Aircraft Electric Propulsion.” *43rd International Conference on Advanced Ceramics and Composites* (2019).

Y.H. Li, S.J. Kim, R. Nardari, D. Oropeza, F.K. Chang. “Development of High Performance BS-PT Based Piezoelectric Transducer for Structural Health Monitoring of High-Temperature Polymer-Matrix Composite Structures.” *Proceedings of the 9th International Workshop on Structural Health Monitoring* (2013).

HONORS AND AWARDS

NASA Space Technology Research Fellowship – Fall 2017 to Present

Alfred P. Sloan Foundation’s Minority Ph.D. Program – Fall 2016 to Present

Zakhartchenko Fellowship – Fall 2018

MIT Department of Mechanical Engineering Ain A. Sonin Graduate Fellowship - Fall 2016

Stanford Departmental Fellowship - Fall 2012 to Fall 2013

ADDITIONAL SKILLS

Languages: Spanish (native speaker), French (coursework), Portuguese (coursework)

Testing Equipment: Universal Testing Machine, Dynamic Mechanical Analyzer, Differential Scanning Calorimeter, Thermogravimetric Analysis, Laser Flash Analysis, 4-Point Probe, X-Ray Diffraction, Spectrometry (UV-VIS, NIR, IR), Scanning Electron Microscopy

Manufacturing/Fabrication Equipment: Machining (Milling/Lathe/Drill/Sawing), Lasercutter, Waterjet, Fused Deposition Modeling, Stereolithography, Binder Jetting

Software: MATLAB, SolidWorks, LabView

Certifications: Private Pilot (VFR, Single Engine Land), Scuba (Open Water Scuba Diver)