

CITIZENSHIP U.S. Citizen

EDUCATION /
ACADEMIA

University of California San Diego

Postdoctoral Scholar, W. M. Keck Foundation Grant

July 2019–July 2020

PI: James Friend

- UC President's Postdoctoral Fellowship (2020–2021)
- Research areas:

- development of contemporary theory for atomization phenomenon
- nozzle-free micro-scale droplet generation
- ultrasonic modulation of cell signaling

University of California San Diego

Ph.D. Mechanical Engineering

2019

- UC President's Dissertation Year Fellowship (2018–2019)
- San Diego Fellowship (2014–2018)
- Graduate Student of the Year
- Interests and expertise:

- applied math, control and stability, identification and estimation, nonlinear/nonconvex optimization, fluid mechanical systems, condensed matter systems, radiative mechanics
- generalized differential models for anomalous spectroscopic dispersion
- generalized frequency-domain analysis for emergent nonlocal dynamics in many-body systems
- predictive analytics with machine learning models / feature engineering

University of California San Diego

M.S. Mechanical Engineering

2016

- San Diego Fellowship (2014–2018)
- Courses (GPA: **3.88**):

- MAE 280 A/B: Linear Systems and Control
- MAE 288 A: Optimal Control
- MAE 283 A: Open-loop System Identification
- MAE 283 B: Closed-loop System Identification and Approximate Control
- MAE 284: Robust and Multivariable Control
- MATH 271 A/B/C: Nonlinear Optimization (UC/EQC/IEQC)
- MAE 210 A/B/C: Fluid Mechanics and Hydrodynamic Stability
- MAE 208: Engineering Mathematics

University of California San Diego

B.S. Mechanical Engineering

2014

- Provost Honors, Warren College Honor Society
- Selected Courses:

- MAE 143 A/B/C: Signals, CT/DT Control Systems
- MAE 144: Embedded Control and Robotics
- MATH 120 A: Complex Analysis

MiraCosta Community College

A.A. Pre-Engineering

2011

- Medal of Honor Scholarship
- President's List, President's Permanent Honor Roll
- President, Phi Theta Kappa Honor Society
- All California Academic Team

EMPLOYMENT

Controls Engineer (intern)

June 2016–December 2016

Cymer / ASML

- Individually undertaken project to research, design, and implement automation upgrades to existing experimental apparatus.
- Machine vision driven feedback loop based on observation of a modulated hydrodynamic instability and multi-stage actuation of an imaging assembly.
- Applied technical skillsets based on project deliverables:
 - mechanical design (5%)
 - software/hardware high- and low-level interfacing (15%)
 - hydrodynamics and hydrodynamic instabilities (15%)
 - control theory (25%)
 - machine vision (40%)

PUBLICATIONS

Orosco, J. and Coimbra, C. F. M.: Simple expression for low-expense approximation of the Bloch-Grüneisen intrinsic resistivity. (in preparation)

Orosco, J. and Coimbra, C. F. M.: Temperature-dependent infrared optical and radiative properties of platinum. International Journal of Heat and Mass Transfer (under review)

Orosco, J. and Coimbra, C. F. M.: Temperature-dependent carrier transport: Low-complexity model for the infrared optical and radiative properties of nickel. Journal of Applied Physics (2019) [Link](#) - [PDF](#)

Orosco, J. and Coimbra, C. F. M.: Anomalous carrier transport model for broadband infrared absorption in metals. Physical Review B (2018) [Link](#) - [PDF](#)

Orosco, J. and Coimbra, C. F. M.: Variable order modeling of nonlocal emergence in many-body systems: Application to radiative dispersion. Physical Review E (2018) [Link](#) - [PDF](#)

Orosco, J. and Coimbra, C. F. M.: On a causal dispersion model for the optical properties of metals. Applied Optics (2018) [Link](#) - [PDF](#)

Orosco, J. and Coimbra, C. F. M.: Optical response of thin amorphous films to infrared radiation. Physical Review B (2018) [Link](#) - [PDF](#)

Orosco, J. and Coimbra, C. F. M.: On the control and stability of variable-order mechanical systems. Nonlinear Dynamics (2016) [Link](#) - [PDF](#)

CONFERENCES

Orosco, J. and Coimbra, C. F. M.: Thermophysical model for the infrared emissivity of metals. Paper and presentation. AIAA SciTech Forum (2019) [Link](#) - [PDF](#)

Orosco, J. and Coimbra, C. F. M.: Causal Models for Gauss-Lorentz Response of Solid Media to Radiative Excitation. Poster session. ASME MEED Conference (2018) [PDF](#)

MANUSCRIPT REVIEW	Elsevier's Energy , The International Journal	2014–Present
	Springer's Nonlinear Dynamics , An International Journal of Nonlinear Dynamics and Chaos in Engineering Systems	2016–Present
	Elsevier's Chaos, Solitons & Fractals , An interdisciplinary journal of nonlinear science	2016–Present
	Springer's Journal of Scientific Computing	2016–Present
	AIP's Physics of Fluids	2017–Present
	Elsevier's Solar Energy , The Official Journal of the International Solar Energy Society	2018–Present
	The Optical Society's Applied Optics	2018–Present
	Elsevier's International Journal of Non-Linear Mechanics	2018–Present
	The Optical Society's Journal of the Optical Society of America A	2020–Present
	The Optical Society's Optics Letters	2020–Present
PROFESSIONAL MEMBERSHIPS	The American Institute of Aeronautics and Astronautics (AIAA)	2018–Present
	American Society of Mechanical Engineers (ASME)	2017–Present
	Institute of Electrical and Electronics Engineers (IEEE)	2017–Present
	The Optical Society (OSA)	2018–Present
	Society of Industrial and Applied Mathematics (SIAM)	2017–Present
SELECTED PROJECTS	Solar Power Variability Management (CEC grant EPC-14-008)	
	- California Valley Solar Ranch (250MW, PV)	
	- State of the art machine learning models for power output forecasts	
	- Novel memory-based feature sets engineered using cutting-edge mathematics	
- Ivanpah Solar Electric Generating System (392MW, CSP)		
- MISO identification-based model of large-scale solar power plant dynamics		
- Determination of spurious plant operation behaviors based on pre- and post-modeling analysis		
Self-balancing Robot - MIP		
- Individual capstone controls project		
- Digital implementation of continuous time modeling and control design		
Fly Righting Response Experimentation Device - Fly2R		
- Team capstone mechanical design project		
- Developed for UCSD's Pharmacology Department for use with experimentation		
- Received Departmental Best Project Award		

Portable Solar Powered Sensing Station - [get\(Sol\)](#)

- Individual research-based design project
- Self-sustaining/monitoring sensing station, internal web/data management
- 6+ month uninterrupted runtime (unplugged, zero maintenance)

AWARDS AND DISTINCTIONS

President's Dissertation Year Fellowship	2018–2019
- 1-Year scholarship: tuition and stipend	
San Diego Fellowship	2014–2018
- 4-Year scholarship: tuition and stipend	
MAE Department Graduate Student of the Year	Spring 2019
MAE Department Best Project: Fly2R	Spring 2014
UCSD Alumni Leadership Scholar	July 2012
Coca-Cola Scholar	March 2010
MiraCosta College Medal of Honor Scholar	Apr 2010
MiraCosta College Foundation Scholar	June 2010

MENTORSHIP

Anthony Nguyen, MAP

- high school outreach research project, Summer 2018
- accepted to and enrolled in UCSD's aerospace engineering major
- current contributing member of Coimbra Research Group

Jamiree Harrison, UC LEADS

- undergraduate research project, Summer 2017
- Ph.D. student at UCSB beginning Fall 2019

Marcel Louis, STARS

- undergraduate research project, Summer 2015
- Ph.D. student at Princeton beginning Fall 2019

Mackenzie Cottle

- high school outreach research project, Summer 2014
- currently enrolled in UCSD's mechanical engineering major

TECHNICAL SKILLSETS

Programming

- Syntax: Python, Matlab, Mathematica, C/C++, Git/SVN, \LaTeX , Bibtex
- Environment: *nix, Windows
- Frameworks: XGBoost, SKLearn, Pandas, CVXPY

Data Science

- Data quality assessment
- Feature engineering
- Regressive models
- Time series analysis

Design and Simulation

- Eagle PCB, Inventor and Autocad, SolidWorks

Circuits and Electronics

- PCB (SMD) prototyping and design, SMD hand-soldering
- Signal conditioning, sensing, actuation
- μ C: BeagleBone, Arduino, Raspberry Pi

Rapid Prototyping

- Machining, lasercamm

Graphical Design

- Adobe Photoshop and Illustrator