**Jeremy Orosco**

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CITIZENSHIP — U.S. Citizen

EDUCATION / ACADEMIA

**University of California San Diego**
*Postdoctoral Scholar* July 2019–July 2021
*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 Friend, J.: 1-Dimensional fast acoustic streaming. (in preparation)

Orosco, J. and Friend, J.: Novel multiscale approach for modeling and analysis of nonlinear continuous systems. (in preparation)

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 (2019) **Link** - **PDF**

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

**Elsevier's Communications in Nonlinear Science and Numerical Simulation** 2020–Present

## Professional Memberships

**The American Institute of Aeronautics and Astronautics (AIAA)** 2018–Present

**American Society of Mechanical Engineers (ASME)** 2017–Present

**The Optical Society (OSA)** 2018–Present

**Society of Industrial and Applied Mathematics (SIAM)** 2017–Present

**American Physical Society (APS)** 2020–Present

**Acoustical Society of America (ASA)** 2020–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

**UC President's Postdoctoral Fellowship** 2020–2021
- 1-Year scholarship: tuition, stipend, and tenure track UC hiring incentive

**UC 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
- μC: BeagleBone, Arduino, Raspberry Pi

**Rapid Prototyping**
- Machining, lasercamm

**Graphical Design**
- Adobe Photoshop and Illustrator