Jeremy Orosco

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CITIZENSHIP U.S. Citizen

EDUCATION

University of California San Diego
Ph.D. Mechanical Engineering March 2016–present
- President's Dissertation Year Fellowship (2018–2019)
- San Diego Fellowship (2014–2018)
- Interests and expertise:
  - applied math, control and stability, identification and estimation, nonlinear/nonconvex optimization, fluid mechanical systems, condensed matter systems, radiative mechanics
  - predictive analytics with machine learning models / feature engineering
  - generalized differential models for anomalous spectroscopic dispersion
  - generalized frequency-domain analysis for emergent nonlocal dynamics in many-body systems

University of California San Diego
M.S. Mechanical Engineering 2016
- San Diego Fellowship (2014–2018)
- Courses (GPA: **3.88**):
  - MAE 293: Flow Control and Estimation (in progress: Winter 2019)
  - 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.: 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

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

Real Time Solar Power Forecasting
- Developed under CEC grant EPC-14-008 for the California Valley Solar Ranch 250MW PV solar power plant
- State of the art machine learning models for power output forecasts
- Utilizes novel memory-based feature sets generated with cutting-edge mathematics

Real Time Resource to Power Modeling
- Developed under CEC grant EPC-14-008 for the Ivanpah Solar Electric Generating System: a 392MW CSP solar power plant
- 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 Departmental Best Project Award: 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

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