

| | | |
|-------------------------|---|--|
| CITIZENSHIP | U.S. Citizen | |
| EDUCATION / ACADEMIA | <p>University of California San Diego <i>Postdoctoral Scholar</i> <i>PI: James Friend</i> - UC President's Postdoctoral Fellowship (2020–2021) - Research areas:</p> <ul style="list-style-type: none"> • rigorous macroscopic theory of micro-scale atomization • micro-scale capillary wave turbulence • nozzle-free micro-scale droplet generation and control • fast (large amplitude) bulk acoustic streaming • acoustic streaming in fractal porous media • ultrasonic modulation of <i>in vivo</i> cell signaling <p>University of California San Diego <i>Ph.D. Mechanical Engineering</i> - UC President's Dissertation Year Fellowship (2018–2019) - San Diego Fellowship (2014–2018) - Graduate Student of the Year - Interests and expertise:</p> <ul style="list-style-type: none"> • 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 <p>University of California San Diego <i>M.S. Mechanical Engineering</i> - San Diego Fellowship (2014–2018) - Courses (GPA: 3.88):</p> <ul style="list-style-type: none"> • 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 | <p>July 2019–July 2021</p> <p>2019</p> <p>2016</p> |

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.: Thermodynamic limit on acoustic conversion efficiency for fast bulk acoustic streaming. (in preparation)

Orosco, J. and Friend, J.: Multiscale articulating differentials method for analysis and modeling of nonlinear continuous systems: Application to microacoustofluidics. (in preparation)

Orosco, J. and Zhang, S. and Friend, J.: Closed-form solution for ultrasonically-driven bulk jet streaming. (in preparation)

Orosco, J., Connacher, W., Zhang, S., and Friend, J.: Time-dependent phase unwrapping for holographic measurement of continuous interfacial dynamics. (in preparation)

Orosco, J. and Coimbra, C. F. M.: Finite Memory Nonlocal Features for Solar Power Forecasting. (in preparation)

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

Zhang S., **Orosco, J.**, and Friend, J.: Mechanism for low-power onset of capillary waves driven by high-frequency ultrasound. (in preparation)

Connacher, W., **Orosco, J.**, and Friend, J.: Droplet ejection at controlled angles via acoustofluidic jetting. *Physical Review Letters* (2020) [Link](#) - [PDF](#)

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](#)

| | | |
|-----------------------------|---|--|
| | <p>Orosco, J. and Coimbra, C. F. M.: Temperature-dependent carrier transport: Low-complexity model for the infrared optical and radiative properties of nickel. <i>Journal of Applied Physics</i> (2019) Link - PDF</p> <p>Orosco, J. and Coimbra, C. F. M.: Anomalous carrier transport model for broadband infrared absorption in metals. <i>Physical Review B</i> (2018) Link - PDF</p> <p>Orosco, J. and Coimbra, C. F. M.: Variable order modeling of nonlocal emergence in many-body systems: Application to radiative dispersion. <i>Physical Review E</i> (2018) Link - PDF</p> <p>Orosco, J. and Coimbra, C. F. M.: On a causal dispersion model for the optical properties of metals. <i>Applied Optics</i> (2018) Link - PDF</p> <p>Orosco, J. and Coimbra, C. F. M.: Optical response of thin amorphous films to infrared radiation. <i>Physical Review B</i> (2018) Link - PDF</p> <p>Orosco, J. and Coimbra, C. F. M.: On the control and stability of variable-order mechanical systems. <i>Nonlinear Dynamics</i> (2016) Link - PDF</p> | |
| CONFERENCES | <p>Orosco, J. and Friend, J.: Spatiotemporal differential partitioning for one-dimensional fast acoustic streaming. Presentation. 179th Meeting of the Acoustical Society of America (2020) Link</p> <p>Orosco, J. and Coimbra, C. F. M.: Thermophysical model for the infrared emissivity of metals. Paper and presentation. AIAA SciTech Forum (2019) Link - PDF</p> <p>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</p> | |
| MANUSCRIPT REVIEW | <p>Elsevier's Energy, <i>The International Journal</i> 2014–Present</p> <p>Springer's Nonlinear Dynamics, <i>An International Journal of Nonlinear Dynamics and Chaos in Engineering Systems</i> 2016–Present</p> <p>Elsevier's Chaos, Solitons & Fractals, <i>An interdisciplinary journal of nonlinear science</i> 2016–Present</p> <p>Springer's Journal of Scientific Computing 2016–Present</p> <p>AIP's Physics of Fluids 2017–Present</p> <p>Elsevier's Solar Energy, <i>The Official Journal of the International Solar Energy Society</i> 2018–Present</p> <p>The Optical Society's Applied Optics 2018–Present</p> <p>Elsevier's International Journal of Non-Linear Mechanics 2018–Present</p> <p>The Optical Society's Journal of the Optical Society of America A 2020–Present</p> <p>The Optical Society's Optics Letters 2020–Present</p> <p>Elsevier's Communications in Nonlinear Science and Numerical Simulation 2020–Present</p> | |
| PROFESSIONAL MEMBERSHIPS | <p>The American Institute of Aeronautics and Astronautics (AIAA) 2018–Present</p> <p>American Society of Mechanical Engineers (ASME) 2017–Present</p> <p>The Optical Society (OSA) 2018–Present</p> <p>Society of Industrial and Applied Mathematics (SIAM) 2017–Present</p> <p>American Physical Society (APS) 2020–Present</p> <p>Acoustical Society of America (ASA) 2020–Present</p> | |

| | | |
|----------------------------|---|-------------|
| SELECTED PROJECTS | Solar Power Variability Management (CEC grant EPC-14-008) | |
| | <ul style="list-style-type: none"> - California Valley Solar Ranch (250MW, PV) <ul style="list-style-type: none"> - 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) <ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> - Individual capstone controls project - Digital implementation of continuous time modeling and control design | |
| | Fly Righting Response Experimentation Device - Fly2R <ul style="list-style-type: none"> - Team capstone mechanical design project - Developed for UCSD's Pharmacology Department for use with experimentation - Received Departmental Best Project Award | |
| AWARDS AND DISTINCTIONS | Portable Solar Powered Sensing Station - get(Sol) <ul style="list-style-type: none"> - Individual research-based design project - Self-sustaining/monitoring sensing station, internal web/data management - 6+ month uninterrupted runtime (unplugged, zero maintenance) | |
| | UC President's Postdoctoral Fellowship | 2020–2021 |
| | <ul style="list-style-type: none"> - 1-Year scholarship: tuition, stipend, and tenure track UC hiring incentive | |
| | UC President's Dissertation Year Fellowship | 2018–2019 |
| | <ul style="list-style-type: none"> - 1-Year scholarship: tuition and stipend | |
| | San Diego Fellowship | 2014–2018 |
| | <ul style="list-style-type: none"> - 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 | William Connacher, MADLab | |
| | <ul style="list-style-type: none"> - Ph.D. candidate in Materials Science at UCSD - coauthored 2020 publication | |
| | Shuai Zhang, MADLab | |
| | <ul style="list-style-type: none"> - Ph.D. student in Mechanical Engineering at UCSD | |
| | Anthony Nguyen, MAP | |
| | <ul style="list-style-type: none"> - 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 | |
| | <ul style="list-style-type: none"> - undergraduate research project, Summer 2017 - Ph.D. student at UCSB beginning Fall 2019 | |
| | Marcel Louis, STARS | |
| | <ul style="list-style-type: none"> - 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