**Jamiree Harrison**

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**CITIZENSHIP:** U.S. Citizen

**EDUCATION:**

**University of California, Santa Barbara** **2019 - Present**
Ph.D. Mechanical Engineering
- Mechanical Engineering Excellence Fellowship
- GPA: 4.0
- Coursework:
  - ME 203: Operator Theory
  - ME 210 A/B: Numerical Analysis: Matrix Analysis, ODEs, PDEs
  - ME 215 A: Applied Dynamical Systems
  - ME 225EY: Biological Computing
  - ME 225 MM: Mathematical Methods
  - ME 236: Nonlinear Control Systems
  - ME 243 A/B: Signals, CT/DT Control Systems
  - ME 269: Network Systems
  - ECE 283: Machine Learning (Supervised, Unsupervised)
- Teaching Assistantship and Tutoring:
  - ME 14: Statics
  - ME 155a: Control System Design
  - ME 163: Vibrations
  - ECE 179: Robot Dynamics and Control

**University of California, San Diego** **2015 - 2019**
B.S. Math – Applied Science
- Chancellor's Associates Scholarship
- Selected Coursework:
  - MAE 101 A: Intro to Fluid Mechanics
  - MAE 108: Probability and Statistics for Engineers
  - Math 103 A: Intro to Abstract Algebra
  - Math 120 A: Complex Analysis
  - Math 142 A/B: Real Analysis
  - Math 154: Intro to Graph Theory
  - Math 171 A: Linear Optimization

**GRADUATE RESEARCH:**

**Biological Control, Computing, and Learning Laboratory** **Jan 2020 – Present**
**University of California, Santa Barbara**
· Designed and built genetic toggle switches with time-varying parameters for the purpose of optimizing plastic degradation done by bacteria.
· Mathematically modelled parameter varying genetic toggle switches.
· Provided stability analysis of time varying toggle switch models through the framework of Koopman Operator theory.
· Developed algorithms which fit time varying parameters to the pertinent toggle switch models.
· Built a library of promoters which give distinct gene expression profiles during different bacterial growth phases.

**UNDERGRAD RESEARCH:**

**Delplanque Research Group** **June 2018 – Aug 2018**
**University of California, Davis** (Funded by UC LEADs)
· Carried out numerical simulations of respiratory drug intake in the human trachea using OpenFOAM.
· Found correlations between parameters of the simulated particle injections and the evenness of the particle distributions.

**Coimbra Research Group** **June 2017 – Aug 2017**
**University of California, San Diego** (Funded by UC LEADs)
- Conducted research on numerical methods to solve variable order differential equations (VODEs) using MATLAB.
- Devised an efficient numerical method that could solve VODEs 50% faster than conventional methods, so VODE model predictions could be made more quickly, improving the energy efficiency of the system.

**Center for Advanced Surgical and Interventional Technology** **June 2014 - Aug 2014**
**University of California, Los Angeles** (Volunteer) **June 2016 - Aug 2016**
- Assisted in the testing of an innovative way to treat prostate cancer known as focal laser therapy.
- Used CAD for the modeling of a human head to test remote trans-oral surgery.
- Developed molds using Solid Works to test the effects of a catheter-fed laser on phantom tissue.
- Compiled lists of potential treatment candidates within the UCLA health database using SQL.
- Tested haptic feedback on the da vinci remote surgical robot.

**EMPLOYMENT:** **Supplemental Instructor** **Sep 2016 - June 2019**
**University of California, San Diego**
- Facilitated math workshops for college students consisting of tutoring and support to ensure their academic success.
- Worked with professors to develop lesson plans for the facilitation of math workshops that supplemented material from courses.
- Classes Supported: Linear Algebra, Calculus (1,2,3), Pre-Calculus.

**PUBLICATIONS:** **Harrison, J.**; Yeung, E. Stability Analysis of Parameter Varying Genetic Toggle Switches Using Koopman Operators. Mathematics 2021, 9, 3133. https://doi.org/10.3390/math9233133

**CONFERENCES:** **Harrison, J.,** Yeung, E.: Analysis and Validation of Parameter Varying Genetic Toggle Switches Using Koopman Operators
- SIAM CSE23

**Harrison, J.**, Ruvalcaba, C., Delplanque, J.-P.: Computational Simulations for the Improvement of Respiratory Drug Intake in the Human Trachea
- SACNAS (2018) | UC LEADs Symposium (2019)
- SACNAS Presentation Award
- UC LEADs Symposium Honorable Mention.

**Harrison, J.**, Orosco, J., Coimbra, C.F.M.: Efficient Numerical Methods for Solving Variable Order Differential Equations
- SACNAS (2017) | SCCUR (2017)

**AWARDS & DISTINCTIONS:**
**Mechanical Engineering Excellence Fellowship** **2019**
-Funding given to a select subset of incoming Ph.D. students.
**Chancellor's Associates Scholarship (UCSD)** **2015 - 2019**
- 4-year full-ride scholarship
**University of California's Leadership Excellence through Advanced Degrees Fellowship (UC LEADs)** **2017 - 2019**
- Funding for 2 Summers of research
- Funding to travel for research conferences.
**Fulfillment Fund Scholarship Recipient** **2015 - 2019**

- 4-year scholarship

**2018 SACNAS National Diversity in STEM Conference Presentation Award** **2018**

**TECHNICAL SKILLSETS:**

**Programming**

-Syntax:
- Python
- MATLAB
- Java
- SQL
- HTML & CSS
- Julia

-Environment:
- Linux
- Windows
- macOS

**Machine Learning:**

-PyTorch
-TensorFlow
-SKLearn
-PCA
-Neural Networks
-Clustering: logistic regression, k-means

**Bio Lab:**

-Bacterial Cell Cultures
-Mammalian Cell Cultures
-DNA Design
-Golden Gate Assembly
-Genetic Editing
-DNA Sequence Analysis
-Genetic Circuit Design
-Gen5 Plate Reader Experiments

**Design and Simulation:**

-Geneious Prime
-Solid Works
-Meshmixer
-OpenFOAM
-3D printing
-Simulink

**Math:**

-Modelling and control biological and physical processes
-Verification and falsification of claims through logic and reasoning
-Probabilistic and Statistical methods
-Numerical Analysis

**Circuits and Electronics:**

-µC: Arduino

**Graphic Design:**

-Adobe Photoshop
-Adobe Illustrator