

# KRISTINA STUCKEY

Phone: (858) 382-0707  
kstuckey@usc.edu

8517 Adobe Bluffs Dr.  
San Diego, CA, 92129

## EDUCATION

---

- |            |  |                            |
|------------|--|----------------------------|
| <b>PhD</b> | University of Southern California<br>Mechanical Engineering<br>Advisor: Paul Newton  | August 2020 – Present      |
| <b>MS</b>  | San Diego State University<br>Applied Mathematics, Concentration in Nonlinear Dynamical Systems<br>Thesis: “Developing Data Driven Methods to Investigate Complex Flows in Bose-Einstein Condensates”<br>Advisor: Christopher Curtis | August 2018 – May 2020     |
| <b>BS</b>  | University of California, Santa Barbara<br>Mathematical Sciences<br>Minored in Physics   | September 2014 – June 2018 |

## RESEARCH EXPERIENCE

---

- |  |                        |
|--|------------------------|
| <b>Research Assistant</b> , University of Southern California<br>Advisor: Paul Newton  | August 2020 – Present  |
| <ul style="list-style-type: none"><li>• Developed time-dependent optimal-adaptive control theory for a replicator dynamical system in the framework of a Hawk-Dove evolutionary game</li><li>• Dynamical altered system to produce control schedules that provide upper and lower bounds on the outcomes for all possible strategies</li><li>• Utilized reinforcement learning dynamics to model COVID-19 vaccine uptake and investigated whether vaccine adoption could be improved by employing dynamic incentive schedules</li><li>• Used a tailored replicator dynamic reinforcement learning model along with optimal control theory to show that well timed incentive programs can improve vaccine uptake by shifting the Nash equilibrium upward in large populations</li></ul> |                        |
| <b>Graduate Student</b> , San Diego State University<br>Advisor: Christopher Curtis  | August 2018 – May 2020 |
| <ul style="list-style-type: none"><li>• Simulated complex flow by implementing Gross-Pitaevskii equation with randomized forcing</li><li>• Applied Dynamic Mode Decomposition in order to reduce the dimensionality of the complex system</li><li>• Employed machine learning techniques to identify and track vortex paths</li></ul>  |                        |

## TEACHING EXPERIENCE

---

### Teaching Assistant, San Diego State University,

August 2019 – May 2020

Course: Calculus II,

- Directed semiweekly sessions for two sections per semester with 30 students each
- Held week office hours to provide tutoring, counseling, or assistance to students
- Assisted in proctoring and grading exams and weekly assignments

## PUBLICATIONS

---

Stuckey, K., Dua, R., Ma, Y., Parker, J. and Newton, P. K., “Optimal dynamic incentive scheduling for Hawk-Dove evolutionary games,” *Phys. Rev. E*, 105(014412), **2022**.

K. Stuckey, and P.K. Newton. COVID-19 vaccine incentive scheduling using an optimally controlled reinforcement learning model. *medRxiv*, 10.1101.22271145, **2022**.

## PRESENTATIONS AND INVITED LECTURES

---

**Poster Presentation**, “COVID-19 vaccine incentive scheduling using an optimally controlled reinforcement learning model,” EITM Poster Symposium, May 16, 2022.

## PROFESSIONAL TRAINING

---

**CSRC Data Science Workshop** San Diego State University, Summer, 2019

Description: Introduction to data science, deep learning, random forests and clustering

## COMPUTER SKILLS

---

**Programming:** Machine Learning Algorithms, Numerical Optimization, Finite Difference and Finite Element Schemes, Discrete and Continuous Mathematical Models, Bifurcation Analysis, Markov Chain Monte Carlo, Stochastic Modeling, Numerical Linear Algebra, Spectral Methods, Optimal Control Theory

**Platforms:** MATLAB, Python, C++, ANSYS, Maple, LaTeX, Microsoft Excel, R