

Samuel Christensen

Department of Mathematics, Computational Medicine

University of California, Los Angeles

✉ sam.em.chris@gmail.com

🏠 <https://samuechristensen.github.io/>

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- EDUCATION**
- University of California, Los Angeles (UCLA)** Los Angeles, CA
 - Ph.D. in Biomathematics Sep 2017 – Present
 - University of Michigan, Ann Arbor** Ann Arbor, MI
 - BS. in Honors Mathematics & Biophysics Sep 2013 – June 2017
- SKILLS**
- Numerical Analysis, Image Analysis, Finite Element Analysis, Linear Algebra, Machine Learning, Python, Pandas, Scikit, MATLAB, Julia, C++, Comsol, SolidWorks, Probability Theory, Stochastic Processes, Partial Differential Equations, and Data Analysis.
- PUBLICATIONS**
- **Christensen S.**, Huang Y., Walch O. J., Forger D. B. Optimal adjustment of the human circadian clock in the real world. *PLOS Computational Biology* 2020.
 - **Christensen S.**, Chu R., Anderson C., Roper M. Fast Asymptotic-Numerical Method For Coarse Mesh Particle Simulation In Channel Of Arbitrary Cross Section. *Journal of Computational Physics* 2022.
 - **Christensen S.**, Roper M. Inertial Migration in Micro-Centrifuge Devices. Submitted to *Physical Review Fluids* 2023.
 - **Christensen S.**, Roper M. Quasi-Steady Inertial Migration in Arbitrary Geometries. In preparation for submission to *Physical Review Fluids* 2023.
- AWARDS**
- Ursula Mandel Medical Science Research Scholarship, **UCLA** 2018
 - NSF Systems and Integrative Biology Training Grant, **NSF** 2018, 2019
- RESEARCH EXPERIENCE**
- **Physics of Microfluidic Devices, UCLA** 2020-Present
 - Created fast and accurate models for cell movement in moderate Reynolds number flows using symbolic and numerical techniques, published in *The Journal of Computational Physics*.
 - Optimized design of cell sorting chambers within microfluidic devices using custom models to increase sorting precision, published in *Physical Review Fluids*.
 - Developed custom cell tracking software from video data that tracked a cell's 3D position, enabling deeper understanding of cell motion within a microfluidic device.
 - **Optimal Sleep Schedules for Overcoming Jet Lag in Minimum Time, University of Michigan 2016-2018**
 - Leveraged data from wearable devices, mathematical models, and control theory, I created optimal sleep schedules for overcoming jet lag under realistic human constraints. Resulted in an iOS app called 'Entrain' with more than 80,000 users and published in *PLOS Computational Biology*.
 - **Genetic Heritability in Fungal Spores, UCLA** 2022
 - Developed hierarchical Bayesian classifier to distinguish fluorescent probes in spore histones.
 - **Machine Learning Analysis of Website Data for Fingerhut.com, UCLA** 2023
 - Guided teams of undergraduate students to train a classifier that predicts which visits were likely to result in a purchase.
- CODING PROJECTS**
- **3-D Fluid Flow Solver in Matlab, MATLAB, COMSOL**
 - Wrote custom Finite Element Navier-Stokes Solver that could quickly calculate the interaction between a cell and the surrounding fluid.
 - Exploited sparse matrix and parallelized structure to accelerate code by a factor of 10.
 - Developed custom preconditioner application which reduced matrix inversion times by a factor of 2.
 - **3-D Cell Tracking from Video Data of Microfluidic Device, MATLAB**
 - Designed and implemented 3-D cell tracking algorithm from 2-D data by using template images, computational solve of the fluid flow, and Kalman filter.
 - Enabled engineers to see cell movements in additional dimension.
 - **Nonlinear Optimal Control Algorithm, MATLAB**
 - Implemented optimal control algorithm to create optimal sleeping schedules for changing the circadian rhythm in minimum time.
 - Adapted algorithm to ensure sleep schedules were customized to user set conditions.
 - **Approximate Bayesian Inference to Classify Microscopy Data Python**
 - Fit modified mixture model to fluorescent intensity data from fluorescently tagged histones.
 - Created classifier that identifies nucleus type in fungal spores based on fluorescence data.
 - **Feature Analysis, Identification, and Classification of Website Data, Python**
 - Trained SVM and logistic regression to rank website users by commercial potential.