Adrian S. Wong

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Education

University of California, San Diego:
- PhD, *Physics with specialization in Computational Science*   Sept 2015 — Dec 2022
- BS, *Physics with specialization in Computational Physics*   Sept 2010 — June 2014

Research Experience

Air Force Research Laboratory:

Applied Mathematician   Aug 2021 — Current
- Attractor reconstruction and analysis of Hall-Effect Thrusters using data-driven methods. (Python)
- Developing Reservoir Computing (RC) code base for applications (Python)
- Theoretical analysis of RC from the Nonlinear Dynamics and Topology perspectives
- Early development of RC in analog hardware for data-driven reconstruction

University of California, San Diego:

Graduate Researcher - Physics Department, Abarbanel Group   Sept 2017 — Current
- Precision Annealing Monte Carlo - Proposed and developed novel model-based path integral methods for accelerated but reliable data assimilation of chaotic physical systems. (C++/Python)
- Reservoir Computing - Examining the theoretical underpinnings of model-free predictions of chaotic physical systems and its efficacy using the principles of nonlinear dynamics and synchronization. (C++/Python)

Lawrence Livermore National Laboratory:

High Energy Physics Intern (Iterative Implicit Monte Carlo Code)   Summer 2017
- Parallelized an industry-level radiation transport code that uses Monte Carlo simulations (C++/MPI)

Computation Intern (Equations of State and Materials Theory Group)   Summer 2016
- Proposed and developed a convexity-enforcing algorithm to repair 'un-physical' regions of data (Python/C++)
- Contributed to an open-sourced polynomial fit library by adding options for different numerical-derivatives (C++)

San Diego Supercomputer Center:

High Performance Computing Intern (High Performance Geo-Computing Group)   Spring 2017
- Arranged data structures for a peta-FLOP Finite Difference code, targeting the Intel Xeon Phi architecture
- Strongly enforced data locality such that cache-misses are minimal (C++/OpenMP)

Other Experience

University of California, San Diego:

Teaching Associate (Physics Department)   Summer 2020
- Designed curricula for an introductory but intensive physics class for 200 students.
- Adapted quickly to COVID-19 related changes to education, specifically the online-only class structure.
- Experimented with non-traditional and modern teaching approaches to teaching physics with students' praise.

Teaching Assistant (Physics Department, Mathematics Department)   Sept 2015 — June 2021
- Taught in lower division, upper division, and even advanced graduate level classes.
- Lead up to 8 junior teaching assistants and organized class activities.

Miscellaneous Projects

Deep Learning Image Classification with AlexNet (Team, C/C++, OpenMP):   June 2017
- Rebuilt the convolutional neural network AlexNet from scratch with a HPC-aware code architecture
- Using pre-trained weights, achieved classification times around 10ms per image (129-by-129 pixels) on CPU

EM Modes in Waveguides (MATLAB):   June 2016
- Implemented both Finite Element and Finite Difference methods to solve Maxwell's Equations in 2D
- Calculated TE & TM modes numerically to determine and validate their respective cutoff frequencies

Monte Carlo Simulation of Non-Ideal Gases (Team, C/C++, OpenACC):   June 2014
- Simulated and characterized the steady-state distributions of a fluid using Monte Carlo Markov Chains

Simulation of the Mice Galaxies' Collision (Team, C/C++, OpenACC):   March 2014
- Wrote and parallelized our own n-body integrator for gravity with softening parameter to run our simulations