

# ANDERSON WAKI MISOBUCHI

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## EXPERIENCE

OpenEye, Cadence Molecular Sciences

**Scientific Developer II**

📅 Aug 2023 – Present 📍 Santa Fe, NM

- Modeling of molecular charge density based on quantum mechanics-derived electrostatic potentials.

**Scientific Developer I**

📅 Jun 2022 – Jul 2023

- Developed algorithms for fast molecular shape similarity in 3D.

University of Texas at Austin

**Graduate Researcher - Weinberg Theory Group**

📅 Aug 2016 – May 2022 📍 Austin, TX

- Investigated the connection between quantum information theory and quantum gravity
- Developed large scale numerical simulations on Texas Advanced Computing Center (TACC) supercomputer

## SKILLS

- **Programming:** C/C++, Python, Mathematica, Matlab
- **Technologies:** Jupyter, Git, LaTeX, Linux
- **Data Science:** Numpy, Scipy, Scikit-Learn, Matplotlib, Pandas, TensorFlow, Keras, MPI
- **Languages:** English, Portuguese

## ACHIEVEMENTS

- 8 articles published in top journals of the field
- 8+ talks and poster presentations in respected conferences

**Selected publications:**

- AM, E. Caceres, R. Pimentel. "Sparse SYK and traversable wormholes" *JHEP* 2021, 15 (2021)
- AM, E. Caceres, J. Pedraza. "Constraining higher order gravities with subregion duality" *JHEP* 2019, 175 (2019)

## AWARDS

- Graduate Continuing Fellowship Award  
University of Texas at Austin - 2020
- ICTP-SAIFR Competition Young Physicists  
3rd place - 2013, 5th place - 2015

## EDUCATION

PhD in Physics

**University of Texas at Austin**

📅 Aug 2016 - May 2022

MS in Physics

**University of São Paulo**

📅 2016

BS in Physics

**University of São Paulo**

📅 2014

**Selected graduate coursework:**

- CS 378 - Geometric Foundations of Data Science
- SDS 380C - Statistical Methods I
- PHY 382N - Nonlinear Dynamics
- CS 395T - Quantum Complexity Theory

## PROJECTS

**Sparse SYK [Github]**

- Simulated a sparse hypergraph based version of the SYK model, a many-body quantum system of great interest in theoretical physics.
- Implemented MPI parallelization and Krylov subspace techniques on TACC Stampede2 supercomputer.
- Achieved current largest scale simulation of the system with  $> 40$  particles.
- Currently assigned as project co-PI to diagnose quantum chaotic properties in the sparse SYK model. Built prototypes and conducted benchmarks to scale up the simulation ready to run on 100+ computing nodes on TACC Frontera.

**Tensor Networks [Github]**

- Investigated applications of *tensor networks*, a framework to simulate quantum systems of many particles, to both supervised and unsupervised machine learning algorithms.
- Produced tutorials about tensor networks aimed at non-physicists using the python library TensorNetwork.
- Implemented algorithm based on Density Matrix Renormalization Ansatz (DMRG) for a classification task using Matrix Product States (MPS) from scratch.