# Courtney Nelson

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## EXPERIENCE

**Halıcıoğlu Data Science Institute** — **San Diego, CA**
*University of California San Diego - Graduate Student Researcher* — *1/2022 - Current*

- Newly appointed to research group applying local conformal autoencoders to image data to improve upon exiting forcasting models.

**MemComputing Laboratory** — **San Diego, CA**
*University of California San Diego - Graduate Student Researcher* — *1/2021-7/2021*

- Performed quantum tomography using unsupervised machine learning to reconstruct pure wave-functions of up to 10 qubits to support the development of quantum hardware.
- Applied Restricted Boltzmann Machine techniques to extract W-state and Transverse Ising Model systems from data resulting in a fidelity of over 9.8 for 8 qubit W-state systems.
- Verified algorithms' success measuring Kullback-Leibler divergence, fidelity, and runtime data.

**Fusion Science and Ion Beam Technology Program** — **Berkeley, CA**
*Lawrence Berkeley National Laboratory - Research Intern* — *01/2018 – 05/2018*

- Established a system for acquiring and analyzing output signal from a EJ309 photomultiplier tube using an oscilloscope to measure the byproducts of potential fusion reactions using pulse shape analysis.
- Verified VORPAL simulation using a particle-in-cell Python package designed for simulating plasmas to understand the condition under which fusion reactions occur and verify experimental data from the photomultiplier tube.

**Publication:** Schenkel, T., Persaud, A., Wang, H., Seidl, P. A., MacFadyen, R., Nelson, C., ... & Chiang, Y. M.. Investigation of light ion fusion reactions with plasma discharges. Journal of Applied Physics 126, 203302 (2019); https://doi.org/10.1063/1.5109445

**National High Magnetic Field Laboratory** — **Los Alamos, NM**
*Los Alamos National Laboratory - Student Researcher* — *06/2018-07/2020*

- Fabricated and calibrated 5 capacitive dilatometers designed to measure thermal expansion and magnetostriction of Plutonium in a 60 Tesla controlled waveform magnet.
- Created detailed part drawings of custom components for use in superconducting magnets, verified by machinist, using Autodesk Inventor.

## EDUCATION

**University of California, San Diego** — **San Diego, CA**
*Physics, PhD* — *2020 - Current*
Relevant Graduate Coursework: Numerical Linear Algebra for Data Science, Parallel Computing

**Occidental College** — **Los Angeles, CA**
*Computer Science and Physics, B.A. (GPA: 3.83)* — *2016 - 2020*
Honors/ Societies : National Goldwater Scholar, Phi Beta Kappa, Sigma Pi Sigma, Kappa Alpha Theta

## SKILLS

**Relevant Skills:** Natural Language Processing, LiDAR, Point Cloud Processing, Python, SQL, Cadence

**Python Libraries:** NumPy, Tensorflow, Scikit-learn, NLTK, Pytorch, Point Cloud Library

## VOLUNTEER WORK

**Philanthropy Director** (*Kappa Alpha Theta - Eta Mu* ): Organized over 800 hours of service completed by 73 chapter members for 7 non profit organizations including: Court Appointed Special Advocates of Los Angeles, Kids Reading to Succeed, and the Los Angeles FoodBank.