

Geoffrey George Gaswint

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Software Experience

Antarctic Ross Ice-Shelf ANTenna Neutrino Array

IRVINE, CALIFORNIA

Graduate Student Researcher

Apr 2017 – Dec 2020

- Established first ever angular resolution measurement of radio induced ultra-high energy neutrino interactions by implementing real data processing modules in Python; measured 3° resolution (improving on the original scientific consensus of 4°), which demonstrates viability of neutrino reconstruction via radio wave measurements.
- Directed a team of scientists installing C++ firmware on neutrino detector Mbed microcontrollers in Antarctica; extended hardware (including installing a new detector at the South Pole), thus improving the effective detector volume from 18.2 km^3 to 23.4 km^3 .
- Proved classically forbidden modes of photon propagation by implementing a custom C++ ray tracing simulation, which extended the theoretical neutrino detection range in Antarctica by $\sim 5\%$.

Theory at University of California, Irvine

IRVINE, CALIFORNIA

Graduate Student Researcher

Apr 2017 – Aug 2019

- Disproved a subset of the varying Yukawa theories (a model exploring the origins of mass) by implementing a custom Python framework to analyze the changes in coupling constants with various theoretical inputs; disproving this narrows the set of Grand Unified Theories in physics and is a step towards our understanding of the origins of mass.

Raytheon

TUCSON, ARIZONA

Systems Engineer

Nov 2015 – Sep 2016

- Implemented missile simulation rendering software and converted MatLab systems into C++ (details classified).

Cryogenic Dark Matter Search

BERKELEY, CALIFORNIA

Undergraduate Researcher

Nov 2013 – Jul 2015

- Implemented a C++ Monte Carlo simulation to model the effects of phonon-electron scattering on germanium and silicon crystal substrates, thus narrowing the theories for "weakly interacting massive particles" (WIMPs) as candidates for dark matter.

Large Underground Xenon dark matter experiment

BERKELEY, CALIFORNIA

Undergraduate Researcher

Nov 2013 – Jul 2015

- Implemented plotting for particle interactions with CCD images using a custom Python script, which helped determine the best alpha particle shielding techniques in order to improve the resolution of dark matter detectors.

Personal Projects

iOS and Android apps

- **DodgerMan3000** (iOS, Android): Dodge enemies with auto-fire mechanics through numerous worlds each with 10 phases. Includes upgrades and much more. (built using React Native).
- **MyBestFriend** (iOS, Android): Chat with a human like bot that can provide comfort through jokes, memes, news, and much more. Fully customizable chat screen. (built using React Native).
- **TapThis!/TapThat!** (iOS, Android): Compete with friends to get the best score on pressing buttons as quickly as you can when they appear. (built using React Native).

Skills

Proficient: Python • Java • React Native • ReactJS

Familiar: C++ • Git • SQL • Linux Systems • MatLab

Natural languages: English (*Fluent*) • German (*Intermediate*)

Education

University of California, Irvine

IRVINE, CALIFORNIA

Ph.D and Masters in Physics

Sep 2016 – Dec 2020

University of California, Berkeley

BERKELEY, CALIFORNIA

B.A. in Physics, B.A. in Mathematics

Aug 2012 – Dec 2014

Grossmont College and San Diego Mesa College and Southwestern College

SAN DIEGO, CALIFORNIA

Associate of Arts in German

Aug 2010 – Jun 2012

Publications

- NuRadioReco: A reconstruction framework for radio neutrino detectors [arXiv-1903.07023](https://arxiv.org/abs/1903.07023)
- Probing angular and polarization reconstruction of the ARIANNA detector at South Pole [arXiv-2006.03027](https://arxiv.org/abs/2006.03027)
- White Paper: ARIANNA-200 high energy neutrino telescope [arXiv-2004.09841](https://arxiv.org/abs/2004.09841)
- Neutrino vertex reconstruction with in-ice radio detectors using surface reflections [arXiv-1909.02677](https://arxiv.org/abs/1909.02677)
- Targeting ultra-high energy neutrinos with the ARIANNA experiment [arXiv-1903.01609](https://arxiv.org/abs/1903.01609)
- Revisiting Electroweak Phase Transition with Varying Yukawa Coupling Constants [arXiv-1810.02522](https://arxiv.org/abs/1810.02522)
- Observation of classically 'forbidden' electromagnetic wave propagation [arXiv-1804.10430](https://arxiv.org/abs/1804.10430)

Interests

Camping in Antarctica, app development, teaching, racquet ball, scuba diving, ukulele, and waltz dancing.