

# Geoffrey George Gaswint

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## Software Experience

### Antarctic Ross Ice-Shelf ANTenna Neutrino Array

IRVINE, CALIFORNIA

Graduate Student Researcher

Apr 2017 – Mar 2021 (*Expected*)

- Established first ever angular resolution measurement of radio induced ultra-high energy neutrino interactions by implementing real data processing modules in Python; measured  $3^\circ$  resolution (improving on the original scientific consensus of  $4^\circ$ ), 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  $18.2 \text{ km}^3$  to  $23.4 \text{ km}^3$ .
- 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

Jan 2016 – 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.

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## 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).

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## Skills

**Proficient:** Python • Java • React Native • ReactJS

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

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

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## Education

University of California, Irvine

IRVINE, CALIFORNIA

**Ph.D and Masters in Physics**

Sep 2016 – Mar 2021 (*Expected*)

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

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## 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)

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## Interests

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