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° 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 ∼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 – 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*

Publications

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

Interests

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