

# Geoffrey Z. Iwata

Ph.D. Physics

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## Expertise

atomic/molecular/optical physics, magnetic sensing, magnetoencephalography, brain-machine interfacing, data science/analysis, python

## Education

Columbia University, Ph.D. Physics, Feb 2018; M.Phil. Physics, May 2015; M.A. Physics, May 2014

• Thesis title: *A cryogenic buffer-gas cooled beam of barium monohydride for laser slowing, cooling, and trapping*

• Research focus: Experimental ultra-cold molecular physics and dipolar quantum interactions.

University of California at Berkeley, B.A. Physics w/ Honors, May 2012

• Senior thesis topic: *Electro-Optical Kerr Effect in Zero-Birefringent PMMA*

• Research focus: Nonlinear magneto-optics, laser stabilization/control, electro-optical effects in solids.

## Experience

Physicist at Kernel

March 2020 - Present

- Interfaced between physics and bio-signals team to push atomic vapor cell magnetometer characterization, optimization and hardening for a full stack magnetoencephalography system.
- Led development and implementation of automated magnetometer operation techniques.
- Designed experimental campaigns with and without human participants, to probe system limitations.
- Collaborated and led on various processing and analyses of neural data, including the design and development of automated pipelines to extract and visualize meaningful neural signals.
- Led and implemented computer vision efforts to track facial features.

Post-doctoral scientist at Johannes Gutenberg University, Germany

March 2018-Feb 2020

Managed several Ph.D. students in projects spanning optical magnetometry, including human biomagnetic field sensing, Li-ion battery magnetometry diagnostics, nitrogen-vacancy based magnetometry, quantum sensor hardware development, data acquisition and processing, experimental software development, and brain-machine interfacing.

Ph.D. researcher in Zelevinsky Lab, Columbia University

Sept 2012 - Feb 2018

- Designed and ran high-precision laser spectroscopy probing Sr2 molecular structure.
- Envisioned, designed and constructed vacuum system, cryostat, laser ablation scheme and cryogenic beam source for novel BaH buffer gas cooling apparatus.
- Performed precise laser spectroscopy on BaH and theoretical study of molecular hyperfine structure and laser cooling of hydrides to form molecular magneto-optical trap.
- Built and implemented a six-laser cooling scheme to slow and cool molecules.
- Managed junior Ph.D. students and undergraduates to assist in projects above.

## Other

Programming Languages: Python, Mathematica, Labview

14 Peer Reviewed journal publications (h = 11)

6 Patents

Con conversationally fluent in Portuguese and Japanese