

# Huan Q. Bui

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## EDUCATION

### Colby College ('21), Waterville, ME

Bachelor of Arts, Majors: Physics & Mathematics, Minor: Statistics

GPA: 4.17/4.30

Rank: 1/560

### Summer school, Perimeter Institute for Theoretical Physics, June 2020

Topics: Path Integrals, Quantum Information, Numerical Methods, Symmetries.

Relevant Coursework: (\*) denotes "Independent Study"

- **Physics:** experimental atomic physics (thesis), quantum field theory\*, quantum information, massive gravity\*, classical field theory\*, quantum mechanics, general relativity, experimental soft matter physics, classical mechanics, E&M, thermo & statmech
- **Mathematics:** applied mathematics (thesis), functional analysis, real analysis, complex analysis, algebraic geometry, abstract algebra, matrix analysis, linear algebra, ordinary differential equations, partial differential equations, probability theory, vector calculus, honors calculus
- **Statistics:** mathematical statistics, statistical modeling, applied longitudinal data analysis

## RESEARCH EXPERIENCE

### Undergraduate Researcher, Perimeter Institute for Theoretical Physics

May—Aug 2020

PI: Timothy Hsieh

- Topic: Quantum many-body physics on quantum hardware

### Research Assistant, Colby College Department of Mathematics & Statistics

Oct 2019—

PI: Evan Randles

- Convolution powers of complex functions on  $\mathbb{Z}^d$  whose attractors involve oscillatory integrals
- Compute convolution powers & highly oscillatory associated attractors
- Generate examples indicative of a new local limit theorem
- Prove a new local limit theorem (in preparation)

### Research Assistant, Joint Quantum Institute - NIST & UMD, College Park

Summer 2019, Jan 2020

PI: Steven Rolston, University of Maryland, College Park

- Studying  $\infty$ -range interactions of Rb near an optical nanofiber (ONF) via collective decay measurements
- Built a polarization optimization system for a future ONF standing-wave dipole trap
- Developed an stand-alone experimental control program with NI-DAQmx in Python

### Research Assistant, Colby College Department of Physics & Astronomy

Nov 2017—

PI: Charles Conover

- 2017-2019: Precision measurement experiments on ultracold potassium in Rydberg states
- 2019-2020: Lifetime measurements of ultracold potassium  $4p$ .
- Data acquisition & analysis; Built ECDL's & frequency-stabilizer electronics for ECDL's
- Controlled photon-counting modules, waveform generators for MOT field-switching, spectroscopy, etc.

### Teaching Assistant, Colby College Dept. of Physics & Dept. of Math & Stats

Sep 2017—

- Current course: Linear Algebra, Quantum Mechanics
- Past courses: Linear Algebra, 2x Modern Physics I & II, EM & Optics, Intro to Mechanics, Ordinary Differential Equations
- Grade psets and conduct weekly TA sessions; Prepared lab equipment for EM & Optics

### Physics & Math Tutor, Colby College Dean of Studies

Nov 2018—

- Provide academic assistance through reviewing course material and solving problems

## PROJECTS

Personal Website/Archive, [GitHub](#), [huanqbui.com](#): notes from class and independent projects.

Experimental Physics: Advisor: Charles Conover; Lifetime measurements of ultracold potassium  $4p$

Theoretical Physics: Advisor: Robert Bluhm; Massive Gravity

Applied Mathematics: Advisor: Evan Randles; Convolution powers of complex functions & harmonic analysis

## HONORS, AWARDS, FUNDS

William A. Rogers Prize in Physics and Astronomy, Colby College

May 2020

Phi Beta Kappa (US national academic honor society)

Apr 2020

Mu Sigma Rho (US national statistics honor society)

Apr 2020

Honorable Mention, COMAP Mathematical Contest in Modeling, S' 20

Linda K. Cotter Internship Fund, for Jan 2020 internship at JQI

Jan 2020

Phi Beta Kappa Scholastic Achievement Award

Sep 2019

Julius Seelye Bixler Scholar

Sep 2018, Sep 2019

**Meritorious Winner**, COMAP Mathematical Contest in Modeling  
**Dean's List**

*S'19*  
*F'17, S'18, F'18, S'19, F'19*

### **CONFERENCES/PRESENTATIONS**

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**DAMOP20:** Measurements of  $f$ -,  $g$ -, and  $h$ -state quantum defects in Rydberg states of  $^{39}\text{K}$ .

**CLAS 2020:** Massive Gravity (*canceled due to COVID-19*)

**CLAS 2020:** Topics in Quantum Information (*canceled due to COVID-19*)

**DAMOP19:** Millimeter-wave precision spectroscopy of  $d$ - $d$  transitions in potassium Rydberg states

**CLAS 2019:** Matrices in Quantum Computing: A 2-qubit entanglement circuit

**CUSRR2018:** Precision measurement of potassium energy levels at highly excited states

### **SKILLS**

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**Technical:** IGOR Pro, R, MATLAB, Python, Mathematica, NI-MAX,  $\text{\LaTeX}$ , Adobe Illustrator, Adobe Lightroom, HTML & CSS, MS Office

**Languages:** English (fluent/proficient), Vietnamese (native)