

Huan Q. Bui

8347 Mayflower Hill
Colby College
Waterville, Maine, USA 04901

Email: hqbui21@colby.edu
Websites: huanqbui.com | [in](#) | [Q](#)
Phone: +1 (301)-704-6958

Education

B.A., Colby College ('21), Waterville, ME

Majors: Physics and Mathematics

Minor: Statistics

GPA: 4.17/4.00, Class rank: 1/560

Summer school, Perimeter Institute for Theoretical Physics, June 2020

Topics in Theoretical Physics: Quantum Information & Thermodynamics, Numerical Methods & Condensed Matter Physics, Path Integrals, Symmetries

Relevant Coursework: (*) denotes "Independent Study"

- **Physics:** experimental atomic physics (thesis), quantum information, massive gravity*, classical field theory*, quantum mechanics, general relativity, experimental soft matter physics, classical mechanics, E&M, thermo & statmech

- **Mathematics:** applied math (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 inference, statistical modeling, applied longitudinal data analysis

Theses

Honors in Physics, Colby College (*in preparation*)

Advisor: Charles Conover

Title:

Honors in Mathematics, Colby College (*in preparation*)

Advisor: Evan Randles

Title:

Research

Undergraduate Researcher, Perimeter Institute for Theoretical Physics, May –Aug 2020

- Area(s): Quantum information, Condensed matter physics
- Principal Investigator: Timothy Hsieh
- Quantum many-body physics on quantum hardware.
 - Studied variational simulation of non-trivial quantum states (QAOA-based, $O(N)$ time)
 - Studying measurement-based algorithms as a candidate for $O(\log N)$ time simulation

Research Assistant, Colby College Dept. of Mathematics & Statistics, Oct 2019–Present

- Area(s): Applied mathematics, Analysis
- Principal Investigator: Evan Randles
- Convolution powers of complex functions on \mathbb{Z}^d whose attractors involve oscillatory integrals.
 - Computed convolution powers & associated attractors that are highly oscillatory integrals
 - Generated examples indicative of a new local limit theorem
 - Studying surface measures of level sets of polynomials associated with these attractors
 - Proving a new local limit theorem (in preparation)

Research Assistant, Joint Quantum Institute, College Park, Summer 2019, Jan 2020

- Area(s): Experimental atomic physics
- Principal investigator: Steven Rolston
- Studying infinite-range interactions and finding evidence of superradiance and super-superradiance between two Rb ensembles trapped around an optical nanofiber via measuring their collective decay.

Research Assistant, Colby College Dept. of Physics & Astronomy, Nov 2017–Present

- Area(s): Experimental atomic physics
- Principal Investigator: Charles Conover
- Precision measurements on ultracold ^{39}K in Rydberg states, 2017-2019
- Lifetime measurements of ultracold $4p\ ^{39}\text{K}$, 2019–

**Conferences/
Presentations**

DAMOP 20, May 2020

Measurements of f -, g -, and h -state quantum defects in Rydberg states of potassium

CLAS (Colby Liberal Arts Symposium) 2020, May 2020

Massive Gravity (*canceled due to COVID-19*)

CLAS 2020, May 2020

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

DAMOP 19, May 2019

Millimeter-wave precision spectroscopy of d - d transitions in ^{39}K Rydberg states

CLAS 2019, May 2019

Matrices in Quantum Computing: A 2-qubit entanglement circuit

CUSRR2018, Jul 2018

Precision measurement of potassium energy levels at highly excited states

Projects

Personal Website/Archive, [GitHub](#), [huanqbui.com](#), Oct 2019 –Present

Notes from class and independent readings plus other projects.

Applied Mathematics, Advisor: Evan Randles, Sep 2019 –Present

Convolution powers of complex functions & harmonic analysis

Experimental Physics, Advisor: Charles Conover

Lifetime measurements of ultracold potassium $4p$, Jan 2018 –Present

Theoretical Physics, Advisor: Robert Bluhm, Feb 2019 –May 2020

Theoretical aspects of Massive Gravity

**Awards/
Honors/
Fundings**

Williams A. Rogers Prize in Physics and Astronomy, Colby College, May 2020

Phi Beta Kappa, April 2020

Mu Sigma Rho, April 2020

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

Linda K. Cotter Internship Fund, Jan 2020

for Jan 2020 internship at the Joint Quantum Institute (JQI), College Park, MD

Phi Beta Kappa Scholastic Achievement Award, Sep 2019

Julius Seelye Bixler Scholar, Sep 2018, Sep 2019

Meritorious Winner, COMAP Mathematical Contest in Modeling, S'19

Top 8% out of more than 10,000 teams

Dean's List, F'17, S'18, F'18, S'19, F'19, (S'20),

Teaching Assistantship

Teaching Assistant, Colby College Dept. of Physics & Astronomy

- Current course: Modern Physics II (quantum)
- Instructor: Robert Bluhm
- Grade weekly problem sets
- Past courses: Modern Physics II (quantum; instructor: Robert Bluhm), Modern Physics I (relativity & early quantum; instructor: Duncan Tate), Introduction to Electricity-Magnetism & Optics (instructor: Charles Conover), Introduction to Mechanics (instructor: Jonathan McCoy)

Teaching Assistant, Colby College Dept. of Mathematics & Statistics

- Current course: Ordinary Differential Equations
- Instructor: Evan Randles
- Grade problem sets & hold weekly TA sessions
- Past courses: Linear Algebra (instructor: Otto Bretscher)

Mathematics & Physics Tutor, Colby College Deans of Studies

- Provide academic assistance through reviewing course material and solving problems

Skills

Physics research: massive gravity, general relativity, optics, precision atomic spectroscopy, Ramsey spectroscopy, fabricating & polarization control in optical nanofibers, magneto-optical & optical dipole trapping, constructing external-cavity diode lasers & frequency-stabilizing electronics, programming arbitrary waveform generators, data acquisition & analysis

Mathematics research: measure theory (elementary), real analysis, numerical integration in Python & Mathematica of highly oscillatory integrals, computing convolution powers of complex-valued functions on \mathbb{Z}^d in Python, general relativity in Mathematica (xACT, xPert)

Programming/Scripting Languages: R, Python, Mathematica, HTML & CSS, \LaTeX

Softwares: IGOR Pro, NI-MAX, PicoHarp & TimeHarp (photon-counting modules), MS Office, Adobe Illustrator, Adobe Lightroom

Languages

English (fluent), Vietnamese (native),

Other Activities

Math Mentor, Colby Dept. of Mathematics & Statistics

Colby Society of Physics Students, Photography, Ultimate Frisbee, Classical guitar

References

[Professor Robert Bluhm](#)

Department of Physics & Astronomy

Colby College
rtbluhm@colby.edu

Professor Charles Conover
Department of Physics & Astronomy
Colby College
cconover@colby.edu

Professor Evan Randles
Department of Mathematics & Statistics
Colby College
erandles@colby.edu