

DR. LUKE REYNOLDS

CONTACT

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231 Park Pl, #34, Brooklyn, NY, USA 11238

EDUCATION

PhD in Physics

University of British Columbia

Sep 2018 - Oct 2023 GPA: 3.8 / 4.0 Vancouver, BC, Canada

MSc with Distinction in Physics University of Otago

Jul 2017 - Jul 2018 GPA: 8.0 / 9.0, First Class Honors Dunedin, Otago, New Zealand

BSc in Physics

Colorado State University Honors College

Aug 2012 - May 2016 GPA: 3.8 / 4.0

Fort Collins, Colorado, USA

SKILLS

- Extreme attention to detail
- Clear written and verbal communication
- · Efficient time and project management
- Perpetually organized
- Creative problem solver

CODING

MATLAB
Python
C

TECHNICAL SKILLS

- Design, construction, and alignment of optics
- · Electrical circuit design and construction
- Statistical data analysis
- Mathematical modeling
- Atomic and molecular spectroscopy
- · Microcontroller operation and application
- Experienced in machine shop work
- CAD/CAM proficiency

ACADEMIC RESEARCH EXPERIENCE

PhD in Magnetic Resonance Biophysics

University of British Columbia Supervisors: Dr. Carl Michal, Dr. Alex MacKay

Sep 2018 - Aug 2023

 Using solid-state nuclear magnetic resonance (NMR) spectroscopy and MRI, I developed, and characterized improvements to clinical MRI techniques for mapping and measuring the human brain. I conceived, simulated and tested a unique model of molecular dynamics between water and lipids for use as a generator of MRI image contrast.

MSc in Atomic Physics

University of Otago Supervisor: Dr. Mikkel Andersen

Jul 2017 - Jul 2018

- Conducted experiments to isolate single atoms with **optical tweezers** for low energy collision study
- Won Division of Sciences 'Best Research Paper Postgraduate Student 2020'

BSc in Ultra-Fast Laser Physics

Colorado State University Supervisor: Dr. Jorge Rocca

Jun 2014 - Jun 2016

 Designed, constructed, and tested a pulsed laser oscillator and amplifier cavity with very high peak power for use in a plasma-based X-ray laser system. Blueprinted, prototyped, and fabricated custom optical components using a CNC mill.

BSc in Atomic Physics

Colorado State University Supervisor: Dr. Siu Au Lee

Aug 2013 - Jun 2014

 Characterized and operated a molecular laser spectroscopy system to lock its frequency for use in an atomic cooling and trapping scheme

TEACHING EXPERIENCE

Teaching Assistant in Physics

University of British Columbia University of Otago Sep 2018 - May 2023 Jul 2017 - Oct 2017

- Taught 20 class sections of 100-level mechanics lectures, 200-level electronics and physics laboratories, and 300-level micro-controller electronics laboratories
- Student Reviews (196 student responses, maximum 5.0)
 - Well prepared: 4.76, Helpful: 4.74, Considerate: 4.77, Clear: 4.71, Effective: 4.69
- Student Ouotes
 - "Luke was an excellent lab TA, and his passion for physics was evident in all his interactions with students. He was always very helpful, and made sure students were left with a thorough understanding whenever they asked a question."
 - "Gave very constructive feedback that also went into and above the theory needed. Very effective at helping and troubleshooting."

Mathematics Tutor

Colorado State University

Feb 2015 - Nov 2015

• Tutored university students in all levels of undergraduate mathematics in a public setting

ORAL PRESENTATIONS

- "Fractional T1 relaxation from magnetization transfer in wood: applications to brain MRI?". Frontiers in Biophysics, Jun 2021. Proceedings online.
- "Adiabatic Inversion and T1 Relaxation of Bovine White Matter". ISMRM Annual Conference and Exhibition, Aug 2020. Proceedings online. Abstract #0527.

INVITED SEMINARS

- "Fractional T1 relaxation from magnetization transfer in wood: applications to brain MRI?". ABQMR Seminar Series, Aug 2021. Online.
- "Direct Measurements of Collisional Dynamics in Cold Atom Triads". Quantum Fluids and Gases. Dodd-Walls Centre Seminar Series, Jul 2020. Online.

POSTER RESENTATIONS

- "Understanding T1 in heterogeneous systems: Extending the two-pool model to fractional order". Frontiers in Biophysics, Jun 2022. Vancouver, BC,
- "Understanding T1 in heterogeneous systems: Extending the two-pool model to fractional order". ISMRM Annual Conference and Exhibition, May 2022. London, UK. Abstract #1507.
- "T1 Relaxation of White Matter Following Adiabatic Inversion". ISMRM Annual Conference and Exhibition, May 2021. Proceedings online. Abstract #3074.
- · "Effects of Adiabatic Pulses on Non-Aqueous Tissue Components". Frontiers in Biophysics, Jun 2019. Vancouver, BC, Canada.

PUBLICATIONS

LA Reynolds, SR Morris, IM Vavasour, L Barlow, C Laule, AL MacKay, CA Michal. Fractionalorder two-pool model for longitudinal nuclear spin relaxation in white matter: a new contrast source in human brain imaging?. Physical Review Letters, (Manuscript under peerreview). Dec 2023.

LA Reynolds, SR Morris, IM Vavasour, L Barlow, C Laule, AL MacKay, CA Michal. Non-aqueous magnetization following adiabatic and selective pulses in brain: T1 and cross-relaxation dynamics. NMR in Biomedicine, 36(8):e4936, Mar 2023. https://doi.org/10.1002/nbm.4936

• **Editorial:** https://doi.org/10.1002/nbm.4997

LA Reynolds, E Schwartz, U Ebling, M Weyland, J Brand, MF Andersen. Direct Measurements of Collisional Dynamics in Cold Atom Triads. Physical Review Letters, 124(7): 073401, Feb 2020. https://doi.org/10.1103/PhysRevLett.124.073401

• Physics Article: Watching Three Atoms Collide

WORK EXPERIENCE

Data Acquisition Specialist

NIVO Consulting Ltd., Vancouver, BC, Canada

Apr 2021 - Aug 2023

· Measured flatness and levelness of new concrete floors on commercial construction sites

Luthiery Apprentice

Bashkin Guitars, Fort Collins, CO, USA

Feb 2016 - Jun 2017

• Built and repaired acoustic and electric guitars with specialized tooling. Installed, tested, and developed a pipeline for a CNC router. Drew technical guitar blueprints. Created and produced a luthiery based podcast

Woodworker

Tyler Morris Woodworking, Fort Collins, CO, USA

May 2016 - Jun 2017

• Manufactured custom and commercial wood products using industrial woodworking machines. Optimized production by designing jigs and maintaining machinery. Managed online sales

INVOLVEMENT

UBC Physics & Astronomy Launchpad Program

Jun 2022

• Participated in panel discussing mentor-mentee relations to incoming graduate students

Ars Scientia Collaboration

2021

• UBC research cluster partnering six physicists with four artists in six-month residencies at the Belkin art gallery that explore academic art-science collaborations

International Society of Magnetic Resonance in Medicine Trainee

2019 - present

Society of Physics Students President

2015 - 2016 academic year

ARCS Foundation National Scholar

2015

Dr. Carl Michal

REFERENCES

Associate Professor, Dept. of Physics, University of British Columbia Email: michal@phas.ubc.ca

Dr. Alex MacKay

Professor Emeritus, Depts. of Physics & Radiology, University of British Columbia

Email: mackay@physics.ubc.ca