

# Andrew Coathup

**Home:** Santiago de Compostela, Spain / Ottawa, Canada

**Citizenship:** Canadian (I have a NIE in Spain and am able to work without limitation)

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## EDUCATION

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### MSc Physics

Sept 2015 – Aug 2017

*University of Victoria, Canada*

- Master's thesis: "Towards Personalized PTV Margins for External Beam Radiation Therapy of the Prostate"
- Research resulted in 2 conference poster presentations
- Link to thesis: [https://acoathup.github.io/Ressources/Coathup\\_Andrew\\_MSc\\_2017.pdf](https://acoathup.github.io/Ressources/Coathup_Andrew_MSc_2017.pdf)

### BSc Honours Physics (Co-op), Magna Cum Laude

Sept 2009 – Aug 2014

*University of Ottawa, Canada*

- Honour's project topic: Mathematical modelling of brain neurons in Python
- Research contributed to a conference proceeding

## EXPERIENCE

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### Research Lab Associate: Laser Generated X-Ray Source

Sept 2020 – Current

*Instituto Galego de Física de Altas Enerxías, Universidade de Santiago de Compostela, Spain*

- Helped to assemble a unique laser-generated x-ray source in a laser facility in northwest Spain
- Programmed in LabVIEW to interface with and program the motion of a motorised stage for precision (<10um position error) laser x-ray interaction
- Reduced stage motion position error to under 10um through a detailed debugging process involving a laser motion sensor that collected motion data every 10ms to a 1um precision
- Worked in a team to align and set-up optical equipment as well as perform a variety of radiation measurements to characterize the x-ray source (spectrometer, radiochromic film, Geiger counter, x-ray imaging, source size measurement)
- Analysis of results (image analysis, measurement of source size, spectrum results, dose, visualization of motion error) all completed in Python

### Secondary School Science Teacher

Jan 2020 – Aug 2020

*O Castro British School, Vigo, Spain*

- Taught 12 different courses (physics, math, and general science to students ages 10 to 18) to 500+ students involving two schedule changes in two months, then adapted to online teaching due to the coronavirus pandemic for the remainder of the year
- Managed heavy workload and adapted to sudden schedule changes
- Communicated effectively with students, parents, other teachers, heads of department

- Adapted to online teaching during coronavirus outbreak
- Regular use of Microsoft word, excel, outlook, zoom, google drive to coordinate and plan within the science department

### ESL English Teacher

Sept 2019 – Dec 2019

*London Eye Language Academy, Vigo, Spain*

- Taught conversational English classes to students aged 6 years old to adults

### University Laboratory Teaching Assistant Positions

Jan 2016 – Apr 2018

*University of Victoria, Canada*

- Developed strong presentation and communication skills by teaching over 150 undergraduate students throughout my graduate studies
- 3 x Lab Instructor for Introductory Physics II which involves common undergraduate physics experiments
- Statistical Programming Assistant for Computational Modelling and Analysis (Python and Java) course. Taught a lecture on an introduction to Python
- Lab Instructor for Introduction to Laboratory Electronics lab. This was a second-year lab that introduced students to a wide variety of laboratory electronic equipment
- Assisted students in the use of common laboratory equipment (oscilloscopes, power supplies, data acquisition systems)

### Research Associate: Data Science in Python in Radiotherapy

Sept 2015 – Aug 2017

*University of Victoria, Canada*

- Independently learned and applied data science and machine learning techniques to predict patient prostate movement during radiation therapy sessions (Python, pandas, scikit-learn)
- Worked and communicated with a team of people coming from diverse backgrounds (oncologists, radiation therapists, medical physicists) to organize patient datasets

### Monthly Quality Assurance (Linear Accelerator and CT)

Oct 2016 – March 2017

*BC Cancer Agency, Victoria, Canada*

- Performed monthly quality assurance (dosimetric, image, mechanical testing) on two clinical linear accelerators (Varian Truebeam) and one computed tomography (CT) simulator (GE Optima 580) according to specific guidelines, documented test outcomes, and reported results to the supervising medical physicist
- Tests performed required hands-on use of common medical physics instrumentation such as ion chambers, electrometers, electronic radiation detectors, and phantoms

### Research Associate: Positron Emission Tomography (PET)

Jan 2015 – Jun 2015

*Ottawa Hospital, Canada*

- Developed strong computational and programming skills by performing PET imaging monte carlo simulations and writing scripts in Matlab.
- Worked collaboratively with other members of the research group to develop new skills and achieve results more quickly

## Undergraduate Co-op Work Terms

- *Semtech Corporation, Ottawa (May 2013 – Dec 2013)*
  - Developed computational skills by modelling packaging electronics in the electrical modelling software EmPro. Wrote Python scripts for modelling software (EmPro).
- *Radiation Protection Bureau, Health Canada, Ottawa (May 2012 – Aug 2012)*
  - Learned new programming skills (Python, SQL) to process and map airborne levels of radiation as a part of the Comprehensive Nuclear Test Ban Treaty
- *SUNLAB, University of Ottawa, Ottawa (Jan 2012 – Apr 2012)*
  - Built research and modelling skills by constructing a model CIGS thin film solar cell and simulating its performance in a proprietary modelling software (Sentauros)

## PRESENTATIONS

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### Conference Presentations

- (1) **Coathup, A.** et al. (2021). *High-precision stabilization of copper rotary target motion for application in a laser-driven x-ray source*. XIII Spanish National Meeting on Optics, 22-24 November 2021. <https://drive.google.com/file/d/15onTXfzMKcz6u-mGw8uo1IoXoMZk-SEX/view> [Poster]
- (2) **Coathup, A.**, Basran, P. (2017). *Personalized PTV margins for prostate cancer patients using a machine-learning approach*. Medical Physics. 44(8):4382, AUG 2017. [Poster]
- (3) **Coathup, A.**, Basran, P. (2017). *Using Patient-Specific Factors to Predict Intra-Fraction Motion in Prostate Cancer Patients with Machine Learning*. Medical Physics. 44(6):2811, JUN 2017. [Poster]
- (4) Morris, C. E., Prikryl, E., **Coathup, A.**, Joos, B. (2013). *Models for the Sensitivity of Voltage Gated K Channels to Bilayer Mechanical Stresses*. Biophysical Journal. DOI: <http://dx.doi.org/10.1016/j.bpj.2012.11.2598> [Poster]
- (5) A. Walker, **A. Coathup**, O. Thériault, H. M. Myers, J. F. Wheeldon, Z. Mi, I. Shih, and K. Hinzer, *Modeling of CuInxGa1-xSe2 solar cells for applications in multi-junction solar cell technologies*, Next Generation Solar, Photovoltaics Canada, Montreal, Quebec, Canada, 14-15 May 2012. [Oral]

### Outreach Invited Talks

- (6) **Andrew Coathup**. *Data Science in Medical Physics and Personalized Radiation Therapy*, Victoria Data Science Meet-Up Group, Victoria, BC. Jan 25, 2018.
- (7) **Andrew Coathup** and Pramodh Yapa, *Quantum Mechanics Symposium, Let's Talk Science*, Victoria, BC. April 25, 2017.

## LANGUAGES

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- English (Native)
- Spanish (Functionally fluent, around C1. Regularly use Spanish at work.)
- French (Working understanding, around B1. Fourth-year quantum mechanics course was completed in French at the University of Ottawa for example.)

## **SKILLS**

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- Python (pandas, scikit-learn, numpy, matplotlib, scipy)
- LabVIEW
- Linux
- Windows
- Github
- Data Analysis
- Data Organization
- Microsoft Office (Excel, Word, Powerpoint, Outlook)
- Analytical Skills
- Problem Solving Skills
- Mathematical Skills
- Ability to learn quickly
- Ability to work independently
- Teamwork

## **APPLICABLE COURSES**

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### **GRADUATE SCHOOL COURSES**

- PHYS 502A – CLASSICAL ELECTRODYNAMICS – GRADE: 96%
- CSC 578D – SPECIAL TOPICS IN COMPUTER SCIENCE: DATA MINING – GRADE: 91%
- PHYS 515 – DATA ANALYSIS TECHNIQUES FOR PHYSICS – GRADE: 89%
- PHYS 535 – RADIOTHERAPY PHYSICS II – GRADE: 89%
- PHYS 539 – RADIATION DOSIMETRY – GRADE: 88%
- PHYS 544 – TOPICS IN RADIATION BIOLOGY – GRADE: 85%
- PHYS 540 – MEDICAL IMAGING – GRADE: 84%
- PHYS 534 – RADIOTHERAPY PHYSICS I – GRADE 70%

### **ONLINE COURSES – CODECADEMY**

- JAVA
- JAVAScript
- C++
- HTML
- GIT
- PHP
- BASH
- ANALYZE DATA WITH SQL
- ANALYZE DATA WITH PYTHON
- DATA SCIENCE CAREER PATH