Andrew Coathup

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EDUCATION

PhD Experimental Physics Sept 2020 – early 2024 (expected)
Galician Institute for High Energy Physics / University of Santiago de Compostela, Spain

Topic: *Commissioning of a vacuum-free laser-plasma x-ray source for application in propagation-based phase-contrast x-ray imaging*

MSc Medical Physics Sept 2015 – Aug 2017
University of Victoria, Canada

Master Thesis Topic: *Towards Personalized PTV Margins for External Beam Radiation Therapy of the Prostate*

BSc Honours Physics (Co-op), Magna Cum Laude Sept 2009 – Aug 2014
University of Ottawa, Canada

Honours Thesis Topic: *Modelling of K Channel Open Probability with Markov Chains*

PROFESSIONAL EXPERIENCE

Research Associate: Laser X-Ray Source, Phase Contrast Sep 2020 – current
Galician Institute for High Energy Physics / University of Santiago de Compostela, Spain

- Programming of a motorized stages to reduce the movement error of a metal target to <10μm such that the surface is always in the focal point of laser pulses arriving at a rate 1000 pulses per second
- Determined parameters required to successfully capture first ever phase contrast image of a biological sample with this novel x-ray source
- Presented the results as an oral presentation at an international conference and made contacts resulting in a >25k€ piece of equipment being brought to the laboratory and the first inter-university experiment to take place at the laboratory
- Precise measurement and analysis of a micron-scale x-ray source size and x-ray spectrum

Skills: Python, Matlab, LabView, ImageJ, work in laboratory environment, experimental debugging, error analysis, independent direction to work, independent research skills, independent learning, ability to begin and foster collaborations, presentation skills, writing skills, time and workload management skills, creative problem solving, resourcefulness under budget constraints, experience in Spanish and European work environments

Secondary School Science Teacher
Jan 2020 – Jun 2020

O Castro British School, Vigo, Spain

- Gave classes in many subjects to 500+ students, then adapted to online teaching due to the coronavirus pandemic for the remainder of the year
- Adapted to two schedule changes in the first two months
- Communicated with various stakeholders (students, teachers, parents, heads of department)
- Organized grades, performance metrics, behavioural metrics for 500+ students

Skills: Communication skills, organizational skills, time management, creativity, resourcefulness

Research Associate: Personalized Radiotherapy
Sep 2015 – Aug 2017

University of Victoria, Canada

- Organization / preparation of patient training data for use in predictive models
- Selection of appropriate data science / machine learning predictive tools
- Application of predictive models to estimate patient motion during radiation therapy

Skills: Error analysis, Python, machine learning, data science, data preparation, independent research skills, independent learning, presentation skills, writing skills, communication skills, Excel

University Teaching Assistant Positions
Jan 2016 – Apr 2018

University of Victoria, Canada

- Tutorial Instructor: Computational Modelling and Analysis (Sept 2017 – Dec 2017)
- Lab Instructor: Introductory Physics II (Jan 2016 – Apr 2016; Jan 2018 – Apr 2018)
- Lab Instructor: Introduction to Laboratory Electronics (Sept 2016 – Dec 2016)
- ESL (English Second Language) Lab Instructor: Introductory Physics II (May 2016 – Aug 2016)
- ESL Tutorial Instructor: Introductory Physics II (May 2016 – Aug 2016)

Skills: Communication skills, organizational skills, problem solving skills, resourcefulness

Monthly Cancer Centre Quality Assurance
Oct 2016 – Mar 2017

BC Cancer Agency, Victoria, Canada

- Performed monthly quality assurance (dosimetric, image, mechanical testing) on two clinical linear accelerators (Varian Truebeam) and one CT simulator (GE Optima 580)
- Tests performed required hands-on use of common medical physics instrumentation such as ion chambers, electrometers, electronic radiation detectors, and phantoms

Skills: Experimental measurements, clinical experience, scientific documentation

Undergraduate Internships

- *Ottawa Hospital, Canada (Jan 2015 – Jun 2015)*
  - *PET imaging research (Skills: Matlab, Monte Carlo)*
- *Semtech Corporation, Canada (May 2013 – Dec 2013)*
  - *Microchip modelling (Skills: Electronic modelling software, Python)*
- *Radiation Protection Bureau, Health Canada, Canada (May 2012 – Aug 2012)*
  - *Airborne radiation monitoring (Skills: Python, MySQL)*
- *SUNLAB, University of Ottawa, Canada (Jan 2012 – Apr 2012)*
  - *Photovoltaic research (Skills: Electronic Modelling software)*

SCIENTIFIC ACTIVITIES

Conference Presentations (Oral)

(1) **Andrew Coathup** et al. (2023). *Propagation-based phase contrast x-ray imaging with a laser-driven x-ray source in air*. IMXP Symposium 2023, July 6-7, 2023 (Garching / Munich).
(2) **Andrew Coathup** et al. (2022). *Phase-contrast x-ray imaging with a laser-driven x-ray source in air.* XXXVIII Reunión Bienal de la Real Sociedad Española de Física, July 11-15, 2022 (Murcia).

Conference Presentations (Poster)

(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 (ONLINE).
(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 (Denver).
(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 (Ottawa).
(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

Schools / Workshops

(1) "IGFAE Workshop on technologies and applied research at the future Galician proton-therapy facility". IGFAE. May 9-10, 2023 (Santiago de Compostela).
(2) "Protonterapia, Imagen médica e inteligencia artificial" (Proton therapy, medical imaging and artificial intelligence). Universidad Complutense de Madrid. July 4-22, 2023 (Madrid).
(3) "Experimental methods in high-intensity laser-plasma processes". 4th Laser-Plasma Summer School (LaPlaSS2021). 27th September-1st October 2021 (ONLINE).
(4) "Workshop on Medical Physics and Statistical Science: Exploring Interfaces and Building Collaborations". The Fields Institute. April 4-5, 2017 (Toronto).

Outreach Talks

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

VOLUNTEER EXPERIENCE

Junta directiva Compostela Swing Mar 2021 – Current
Santiago de Compostela, Spain

- Take active role in promoting swing dance throughout the city
- Made contacts with local businesses in the city to discover new dancing opportunities
- Create poster ads and manage social media accounts
- Number of participants in weekly events has grown 5x since joining the organizing team

LANGUAGES

English (Native), Spanish (Advanced – DELE C1), French (Basic – High School Immersion)