Andrew Coathup

EDUCATION AND TRAINING

01/09/2020 – CURRENT Santiago de Compostela , Spain

DOCTORATE University of Santiago de Compostela (USC) / Galician Institute for High Energy Physics (IGFAE)

Website https://www.usc.gal/gl │ **Field of study** Experimental Physics │

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

01/09/2015 – 31/08/2017 Victoria , Canada
MASTER OF SCIENCE University of Victoria

Website https://www.uvic.ca/ │ **Field of study** Medical Physics │

Thesis Towards Personalized PTV Margins for External Beam Radiation Therapy of the Prostate

01/09/2009 – 31/08/2014 Ottawa, Canada
HONOURS BACHELOR OF SCIENCE (WITH INTERNSHIPS) University of Ottawa

Website https://www.uottawa.ca/en **Field of study** Physics **Final grade** Magna Cum Laude **Thesis** Modelling of K

Channel Open Probability with Markov Chains in Python

WORK EXPERIENCE

▪ **UNIVERSITY OF TRIESTE, INFN TRIESTE** – TRIESTE, ITALY

POSTDOCTORAL RESEARCHER: PHOTON-COUNTING, PHASE-CONTRAST, SPECTRAL MICRO-CT –
23/04/2024 – CURRENT

- Modelling and experimental validation of an experimental photon-counting, phase-contrast, spectral CT system in the PEPI lab (INFN Trieste)
- The spectral, photon-counting, phase-contrast x-ray imaging micro CT simulation tool is freely available here: PEPIsim
- Numerous micro CT acquisitions of diverse samples requiring precision alginment
- Introduced a GUI-based reconstruction pipeline that includes image preprocessing, CT reconstruction, phase-retrieval and spectral decomposition by contributing to existing code
- Experience operating various types of x-ray laboratory equipment including a micro-focus x-ray source, aspectral x-ray detector, numerous motorized stages, nitrogen gas tanks, chiller

Skills: Matlab, ImageJ, software development, laboratory experience, micro-CT, phase-contrast x-ray simulation, spectral computed tomography, manuscript preparation, experience in Spanish and European work environments

▪ **GALICIAN INSTITUTE FOR HIGH ENERGY PHYSICS / UNIVERSITY OF SANTIAGO DE COMPOSTELA** – SANTIAGO DE COMPOSTELA, SPAIN

RESEARCH ASSOCIATE: LASER X-RAY SOURCE, PHASE-CONTRAST X-RAY IMAGING – 01/09/2020 –
CURRENT

- Programmed 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, independent learning, ability to begin and foster collaborations, presentation, writing, time and workload management, creative problem solving, resourcefulness under budget constraints, experience in Spanish and European work environments

⬤ **O CASTRO BRITISH SCHOOL** – VIGO, SPAIN

SECONDARY SCHOOL SCIENCE TEACHER – 01/01/2020 – 30/06/2020

- Prepared and taught classes in a variety of math, physics and science subjects to 500+ students, then adapted toonline 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, organizational, time management, creativity, resourcefulness

⬤ **UNIVERSITY OF VICTORIA** – VICTORIA, CANADA

UNIVERSITY TEACHING ASSISTANT POSITIONS – 01/01/2016 – 30/04/2018

- 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, organizational, problem

solving, resourcefulness

⬤ **BC CANCER AGENCY / UNIVERSITY OF VICTORIA** – VICTORIA, CANADA

RESEARCH ASSOCIATE: PERSONALIZED RADIOTHERAPY – 01/09/2015 – 30/08/2017

- 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, independent learning, presentation, writing, communication, Excel

⬤ **BC CANCER AGENCY** – VICTORIA, CANADA

MONTHLY CANCER CENTRE QUALITY ASSURANCE – 01/10/2016 – 31/03/2017

- 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

⬤ **OTTAWA HOSPITAL** – OTTAWA, CANADA

RESEARCH ASSOCIATE: PET IMAGING – 01/01/2015 – 30/06/2015

- Monte Carlo simulations
- Matlab scripting

⬤ **SEMTECH CORPORATION** – OTTAWA, CANADA

STUDENT INTERNSHIP – 01/05/2013 – 31/12/2013

- Microchip modelling
- Package engineering
- Python scripting

⬚ RADIATION PROTECTION BUREAU, HEALTH CANADA – OTTAWA, CANADA

STUDENT INTERNSHIP – 01/05/2012 – 31/08/2012

- Airborne radiation mapping
- Python scripting

⬚ SUNLAB PHOTOVOLTAIC RESEARCH GROUP, UNIVERSITY OF OTTAWA – OTTAWA, CANADA

STUDENT INTERNSHIP – 01/01/2012 – 30/04/2012

- Solar cell modelling / simulations

CONFERENCE PRESENTATIONS

Journal Articles

Reija, A., **Coathup, A.**, Alejo, A., Bembibre, A., Contreras-Martínez, R., Peñas, J., Ruiz, C., Seimetz, M. and Benlliure, J., 2025. Optimisation of a laser-driven X-ray source operating in air. *Optics Express*, *33*(7), pp.16125-16140.

Conference Proceedings

Reija A, Contreras-Martínez R, **Coathup A**, Barranco F, Juan J, Alejo A, Bembibre A, Benlliure J, Peñas J, Aguado-Barrera ME, Vega A. Radiobiology experiments with a laser driven x-ray source: Exploring the UHDR regime. InEPJ Web of Conferences 2023 (Vol. 290, p. 08001). EDP Sciences. **Oral Presentations**

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).

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). **Poster Presentations**

Contreras-Martinez, R., **Coathup, A.**, Reija, A., Aguado-Barrera, M. E., Benlliure, J., Peñas, J., ... & Seimetz, M. (2022). *A TABLETOP LASER-DRIVEN X-RAY SOURCE FOR RADIOBIOLOGICAL STUDIES IN THE FLASH REGIME*. Physica Medica, 94, S87.
DOI: https://doi.org/10.1016/S1120-1797(22)01633-7

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).

Coathup, A., Basran, P. (2017). *Personalized PTV margins for prostate cancer patients using a machine-learning approach*. Medical Physics. 44(8):4382, AUG 2017 (Ottawa).

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, JUL 2017 (Denver).

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

09/05/2023 – 10/05/2023
IGFAE Workshop on technologies and applied research at the future Galician proton-therapy facility

Instituto Galego de Física de Altas Enerxías (Santiago de Compostela).

04/07/2022 – 22/07/2022
Protonterapia, Imagen médica e inteligencia artificial

Universidad Complutense de Madrid (Madrid).

27/09/2021 – 01/10/2021
Experimental methods in high-intensity laser-plasma processes

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- 4th Laser-Plasma Summer School (LaPlaSS2021). (ONLINE).
04/04/2017 – 05/04/2017
Workshop on Medical Physics and Statistical Science: Exploring Interfaces and Building Collaborations

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The Fields Institute (Toronto).

VOLUNTEERING

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01/03/2021 – 01/04/2024 Santiago de Compostela
Organizing Committee Compostela Swing

- 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 **Link**

https://www.instagram.com/compostela_swing/?hl=es

LANGUAGE SKILLS

Mother tongue(s): **ENGLISH**
Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
FRENCH	B1	B1	A2	A2	A2

SKILLS

NI LabVIEW 2019 | Imagej | Microsoft Excel | Microsoft Word | Outlook | Microsoft Powerpoint | Microsoft Office | Teamwork & collaboration | knowledge of many laboratory instruments and tools | Strong Time Management | planning and organising skills | Python (pandas, numpy, matplotlib) | MATLAB | Python (computer programming) | computer programming