

NICHOLAS MCCARTHY, PHD

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SUMMARY

- Interdisciplinary scientist and engineer with skills and experience in machine learning, algorithm development, computer vision, medical imaging, and graph representation learning.
- Managed collaborative R&D projects applying machine learning in multiple applicative domains, resulting in peer-reviewed publications and filed patents.
- Further interest in natural language processing, data privacy, recommender systems and computational creativity.
- Deep understanding of data analysis and modelling, including neural networks and standard machine-learning toolkits.
- Self-motivated, problem-solving and collaborative with excellent communication skills.
- Looking to find creative and personal applications of artificial intelligence, and to contribute to advancing their use in clinical and healthcare applications.

TECHNICAL SKILLS

- **Programming:** Python, R, C++, Matlab, Java, C, C#, Perl, PHP, Javascript, Bash scripting
- **Analytics/ML:** Pytorch, TensorFlow/Keras, scikit-learn, numpy, scipy, pandas, matplotlib, OpenCV, Weka, SPSS, SAS, neural networks, supervised/unsupervised learning, knowledge graphs, computer vision
- **Dev/Ops :** Linux, Windows, Docker, *SQL, Docker, Spark, SparQL, AWS

EXPERIENCE

University College Dublin

Senior Research Engineer

School of Medicine, UCD, Belfield, Co. Dublin

Dec 2020 to present

- Senior ML Engineer responsible for RD and product development in a novel healthcare application involving musculo-skeletal imaging and artificial intelligence, with commercialization funding provided by Enterprise Ireland.
- Research collaborations and student supervision as part of the Machine Learning in Medical Imaging and Diagnostics lab in UCD School of Medicine.

Accenture

Associate Principal

The Dock, Grand Canal Dock, Dublin 2

Sep 2018 to Dec 2020

- Managed and collaborated with teams of data scientists in RD projects across a number of application domains including computer vision, computational creativity, graph representation learning, and data privacy.
- Projects resulted in 10+ patent filings and 3 peer reviewed publications.

Research Engineer

Oct 2017 to Sep 2018

- Worked in multi-disciplinary R&D teams on a range of projects in computer vision, analytics, and graph domains.

Contractor

Mar 2017 to Oct 2017

Freelancer

Dublin, Ireland

Jul 2015 to Jul 2017

- Working directly with clients to develop custom back and front-end software for web applications using HTML5/CSS and Javascript.

PathXL Ltd.

Northern Ireland Science Park, Unit 2, Innovation Centre, Belfast, BT3 9DT, Northern Ireland

Research Fellow

Jan 2014 to Jan 2015

I was seconded to PathXL under the FAST-PATH Marie Curie IAPP Programme. My work revolved around the development of a robust machine-learning pipeline for the development of predictive models, and investigating methods of extending PathXLs TissueMark software from the tumour-nontumour identification modality to include multiple cancer tissue types.

University College Dublin

School of Computer Science, UCD, Belfield, Co. Dublin

PhD Student

Oct 2011 to Aug 2015

The focus of this PhD was the discovery of new imaging bio-markers for clinical application in the evaluation of prostate cancer, and development of computer-aided diagnosis (CAD) systems. I took courses in Collective Intelligence and Data Programming, electives in Cell Biology and Genetics, and was employed as a Lab Demonstrator and Teaching Assistant.

Teaching Assistant/Demonstrator

Oct 2011 to Aug 2015

I was employed as a teaching assistant or demonstrator in the following courses:

- Intro to Image Analysis in Matlab (RDGY30440)
- Introduction to A.I. (COMP30030)
- Foundations of Computing (COMP30010)
- Introduction to A.I (COMP30030)
- Software Engineering 3 [2012] (COMP30010)
- Compiler Construction (COMP30440)
- Introduction to Programming I II [MSc.] (COMP40020)
- Digital Systems (COMP20020)

- PhD, Computer Science/Computational Pathology, School of Computer Science and Informatics, University College Dublin, 2015.
Thesis: **Development of a Computational Pathology System for Whole-Slide Detection and Grading of Prostate Cancer**
- BA, Computer Science, School of Computer Science and Informatics, University College Dublin, 2011
- St Michael's College, Ailesbury Road, Dublin 4, 2008

CONFERENCE PRESENTATIONS / REVIEWER

- Knowledge Graph Embeddings: From Theory to Practice (*kge-tutorial-ecai2020.github.io*), Costabello, L., Pai, S., McCarthy, N., Janik, A., 24th European Conference on Artificial Intelligence
- PC Member: CIKM 2020 Applied Research Track, ESWC 2020 In-Use Track
- Reviewer: ECAI 2020, Journal Computerized Medical Imaging and Graphics
- Ul Ain, Q., and McCarthy, N., (2019), Predicting Pleasantness from Joint Perceptual and Structural Embedding Space (Poster), Eight Joint Sheffield Conference on Chemoinformatics
- McCarthy, N., (2014) Texture Analysis and Gleason Sub-Pattern Classification in Prostate Cancer Staging (Poster), Pathology Informatics 2014 Conference, Pittsburgh, PA.

PUBLICATIONS

- Franciosi, A. N., McCarthy, et. al. (2022) **Extended D-dimer cut-offs and machine learning for ruling out pulmonary embolism in individuals undergoing computed tomography pulmonary angiography**. European Respiratory Journal, 59(5).
- McCarthy, N, et al. (2021) **Enterprise imaging and big data: A review from a medical physics perspective.**, Physica Medica 83 (2021): 206-220.
- H. Singh, McCarthy, N., Ul Ain, Q., Hayes, J. (2020), **ChemoVerse: Manifold traversal of latent spaces for novel molecule discovery**, 1st Workshop on Applied Deep Generative Networks, European Conference on Artificial Intelligence 2020
- McCarthy, N., Karzand, M., Lecue, F. (2019). **Amsterdam to Dublin Eventually Delayed? LSTM and Transfer Learning for Predicting Delays of Low Cost Airlines**. Proceedings of the AAAI Conference on Artificial Intelligence, 33, 9541-9546.
- Doggett E. V., Wolak, A., Tsatsoulis, P. D., and McCarthy, N.. (2019). **Neural pixel error detection**. In ACM SIGGRAPH 2019 Talks (SIGGRAPH '19). Association for Computing Machinery, New York, NY, USA, Article 23, 1-2.
- McCarthy, N., Cunningham, P., O'Hurley, G. (2014). **The contribution of morphological features in the classification of prostate carcinoma in digital pathology images**. Proceedings - International Conference on Pattern Recognition, 3269-3273.

Patents

- **Determining Anonymized Temporal Activity Signatures of Individuals**, US Patent 10,262,079 B1, Issued Apr 16 2019.
- **Cognitive Searches Based on Deep Learning Neural Networks**, US2019/0188295 A1, Published Jun 20 2019
- **Data Security and Protection System using Distributed Ledgers to Store Validated Data in a Knowledge Graph**, US2019/0312869 A1, Published Oct 10 2019
- **Density-based Computation for Information Discovery in Knowledge Graphs**, US 2020/0110746 A1, Published Apr 9 2020
- **Modeling and Decision Support for Horticulture**, EP 3 617 816 A3, Published Mar 11 2020
- **Pixel Error Detection System**, US 2020/0219245 A1, Published Jul 9 2020.

PROJECTS

- **AmpliGraph** *ampligraph.org* Open source Python library that predicts links between concepts in a knowledge graph.
- **PathXL Algorithm Framework** A scalable plugin framework and utility class suite for developing image analysis algorithms within digital pathology. Written using C++11, OpenCV and OpenMP.
- **WeKaLab** *github.com/NicholasMcCarthy/wekalab* Matlab library for interacting with the Weka ML framework.

AWARDS

- FAST-PATH European Marie Curie Research Fellowship Grant
- AmpliGraph: Best Technical Advance In The Field Of Data Science/AI From A Research Organisation, European DatSci Awards 2019
- Best Poster Presentation, API 2014 Imaging Informatics

REFERENCES

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