

CRT—Machine Learning

Structured Doctoral Pathway 2020-21

Overview

The Centre for Research Training in Machine Learning is designed to address the urgent industry demand for ML talent. The centre will produce academically outstanding, industry-ready PhD graduates in tightly connected cohorts. These graduates will be future leaders managing the disruption that ML is causing across industry and society, and will strengthen the reputation of Ireland as a global hub for ML education, research, and application.

The centre is a collaboration between University College Dublin (UCD), Dublin City University (DCU), and the Technological University of Dublin (TUD). It brings together 57 ML-focused, internationally recognised supervisors who work at the cutting-edge of ML research and its application. Students will benefit from a world-class, inter-institutional programme in a mature interdisciplinary environment that emphasises state-of-the-art research with an industry-relevant and entrepreneurial focus. The activities at the centre are built around four pillars:

- **ML Fundamentals:** The fundamental theory, algorithms, techniques, and technologies on which ML is based.
- **ML in Society:** From the displacement of jobs to the creation of filter bubbles, ML is having an enormously transformative effect on society which needs to be examined, understood, addressed, and communicated.
- **ML Practice:** As ML technologies have moved out of the lab, a body of best practice has emerged around how to design, develop, deploy, and maintain ML solutions; as well as how to organise the teams that do this work and the projects that they do.
- **ML Applications:** ML is having a disruptive effect on industries from fashion to agriculture which is driving new ways of operating in these industries and new ML approaches to match industry-specific demands.

Module Choices within the CRT in ML

All modules in this Pathway are core (mandatory) such as ML Bootcamp (10 ECTS UCD); Industry Placement (15 ECTS UCD), Annual Summer School — where attendance is compulsory. Students are also expected to take 30 credits of taught modules from any of the host institutions.

Induction and non- accredited training

All students are required to attend the orientation and induction sessions organised by GSO during year one. GSO communicates details of their training schedule to each student at the beginning of each semester. First year students are also required to complete and successfully pass the **Online Research Integrity Training Module** during year one of their studies.

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Core Modules Year 1

- ML Bootcamp (10 ECTS) UCD
- Annual Summer School Year 1 (0 ECTS) UCD (attendance is compulsory)
- Taught Modules (Total 30 ECTS) from any of the host institutions such as:

Data Analysis & Machine Learning
EE514 (7.5 ECTS) DCU

Multivariate Analysis STAT40740
(5ECTS) UCD

Cloud Computing - CA4106 (7.5
ECTS) DCU

Deep Learning SPEC9993 (5 ECTS) TU
Dublin

Statistical Inference & Linear Algebra
(5 ECTS) UCD

Core Modules Year 2

- Industry Placement (15 ECTS) UCD (This can also be taken in Year 1 or 3)
- Annual Summer School Year 2 (0 ECTS) UCD

Core Modules Year 3

- Annual Summer School Year 3 (0 ECTS) UCD