



Proposal for New Degree Programmes

Stage 2

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THE UNIVERSITY OF EDINBURGH

PROGRAMME SPECIFICATION FOR [*INSERT NAME OF PROGRAMME OF STUDY, e.g. M.A. Honours in Ancient History or M.Sc. in Public Health*]¹

PROGRAMME SPECIFICATION

Grey text has been added to provide guidance. Please delete as you add your own text, remove italics, and change the font colour to black.

OVERVIEW

Awarding Institution	University of Edinburgh
Teaching Institution	University of Edinburgh
Programme accredited by	n/a
Final Award	PhD
Programme Title	PhD in Biomedical Artificial Intelligence
UCAS Code	n/a
Relevant QAA Subject Benchmarking Group(s)	n/a
Postholder with overall responsibility for QA	Director of QA (currently John Longley)
Date of Production/revision	24/10/2018

¹ The information contained in this Programme Specification should be used as a guide to the content of a degree programme and should not be interpreted as a contract.

EXTERNAL SUMMARY

Delivering healthcare that meets the needs of a growing and ageing population is a defining scientific and societal challenge for the twenty-first century. Solutions to this challenge are contingent on our ability to effectively interrogate and model the increasingly larger data sets that biomedical sciences are producing. Artificial intelligence (AI) techniques hold immense promise in this field, but the unique scientific, societal and ethical/ legal dimensions of the biomedical field pose considerable research challenges to the AI community. The proposed PhD programme within the UKRI Centre for Doctoral Training (CDT) in Biomedical AI at Edinburgh, a collaboration of the Schools of Informatics, Biological Sciences, Social and Political Sciences, and the Usher institute and MRC Institute of Genetics and Molecular Medicine, addresses this challenge.

The programme delivers research training to CDT students by embedding them in the world class, interdisciplinary research environment provided by the participating institutes. Students will have already completed a preparatory MSc by research in the first year of the CDT programme, equipping them with the computational and biomedical foundations, as well as providing a background in the societal/ ethical aspects of research and giving hands-on experience of research at the interface of computational and biomedical sciences. Graduates of the PhD programme will complement the broad background provided by the MSc year with exceptional depth in a particular area of Biomedical AI, enabling them to become research leaders and innovators within the future scientific landscape.

200-250 Words

- *Background to the discipline and subject, what it is and its place in human endeavour.*
- *What is special about the Edinburgh experience in this degree?*
- *What are the main programme aims (learning outcomes)?*

EDUCATIONAL AIMS OF THE PROGRAMME

The programme is aimed at students who have successfully completed the MSc (Res) programme. The students will then develop in depth knowledge and research skills in one particular domain of Biomedical AI. The educational aim of the programme is to equip

This section should describe what the University/School aims to achieve through the programme (Programme descriptions may be read by potential applicants)

- *Describe briefly the general area of study and how the programme is placed within it*
- *Mention any distinctive features of the programme at the UoE*
- *List the principal aims of the programme (around 6)*

Do not duplicate any information from the External Summary

PROGRAMME OUTCOMES

Knowledge and Understanding

Students successfully completing the programme will:

- have a strong working knowledge of modern AI techniques;
- have a broad awareness of the role of AI within biomedical research;
- have working experience of applying and/or develop AI methods appropriate to biomedical problems;
- be able to analyze and anticipate societal and ethical questions arising from the application of AI in a biomedical context.

Entries should describe the acquisition of knowledge as opposed to the ability to do something

Graduate Attributes: Skills and abilities in Research and Enquiry

Graduates from this course will:

- be able to select and develop appropriate AI methods to approach biomedical research questions;
- be able to evaluate the societal implications of AI research;
- be able to understand and explain state-of-the-art AI research;
- be conversant with interdisciplinary research in both computer science and biomedical sciences.

Graduate Attributes: Skills and abilities in Personal and Intellectual Autonomy	<p>Graduates from the course will:</p> <ul style="list-style-type: none"> - be able to handle large biomedical data sets; - be able to independently develop and implement AI methodologies and deploy them on biomedical data sets; - be able to identify biomedically relevant aspects of the results of their research.
Graduate Attributes: Skills and abilities in Communication	<p>Graduates from the programme will:</p> <ul style="list-style-type: none"> - be able to communicate orally their research to an interdisciplinary audience through presentations; - be able to summarise their research in a scholarly way through project reports; - be able to work effectively as part of an interdisciplinary team;
Graduate Attributes: Skills and abilities in Personal Effectiveness	<p>Graduates will have proven ability to:</p> <ul style="list-style-type: none"> - acquire knowledge from a variety of sources, including the research literature, peer interaction, online materials, conferences; - work effectively and independently on large projects, both individually and as part of a team - initiate and sustain interdisciplinary collaborations - organize their workload and manage their time, and complete tasks under deadline pressure
Technical/practical skills	<p>Graduates of the programme will be able to:</p> <ul style="list-style-type: none"> - implement and test AI models to be deployed on novel biomedical questions. - code scientifically in a high-level programming language; - use public and proprietorial biomedical data sets for their work.

Entries should be high-level technical or practical skills developed during the degree programme

PROGRAMME STRUCTURE AND FEATURES

The programme is structured according to the normal University PhD training, with yearly review meetings. Each student will enjoy joint supervision from a computational and a biomedical scientist, with a third external panel member participating in the review meetings. Opportunities for internships and/or international research visits are built into the programme (and budgeted for); depending on the relevance to the thesis topic, interruption of studies applications may be required.

Based on the annual evaluations, the CDT progression committee decides annually on the progression of all CDT students. Students whose marks and annual evaluation has not been satisfactory but shows potential for improvement will be allowed to progress under specific conditions (e.g., re-doing the progress report).

The CDT progression committee will consist of the CDT directors, and one member of the Informatics Graduate School.

Mode of study: full time

Language of study: English

TEACHING AND LEARNING METHODS AND STRATEGIES

As with all PhDs, the learning methods will consist of regular supervisions (weekly on average) involving both supervisors, and mostly independent study.

TEACHING AND LEARNING WORKLOAD

Please indicate the typical workload for a student on this programme for each year of study

Start Year	Time in scheduled teaching (%)	Time in independent study (%)	Time on placement (%)
1	0	100	0

2	0	100	
3	0	100	
			<i>Add rows as necessary</i>

ASSESSMENT METHODS AND STRATEGIES

The final PhD will be assessed through a viva voce defense involving both external and internal examiners, as per standard University procedures.

ASSESSMENT METHOD BALANCE

Please indicate the typical assessment methods for a student on this programme for each year of study. Additionally please complete the Assessment matrix.



Assessment Matrix
Template.xlsx

Start Year	Assessment by written exams (%)	Assessment by practical exams (%)	Assessment by coursework (%)
<i>Year 1</i>	<i>70</i>	<i>15</i>	<i>15</i>
			<i>Add rows as necessary</i>

CAREER OPPORTUNITIES

Overall, career opportunities for graduates are broad and favourable at the moment. Biomedical AI is expected to be a sector of particular growth in the near to medium term, as highlighted in several governmental reports (Industrial Strategy, Life Sciences Industrial Strategy, etc) as well as major industrial players (Association of British Pharma Industry, Glaxo-Smith-Klein strategic report 2018). According to the EU patent office, the Med-Tech sector filed the largest number of new patents in 2017 than any sector. Anecdotal evidence from colleagues working in the field suggests a buoyant job market in both

public and private sector with a lively start-up ecosystem. All of these facts point to a high employability for any graduates of the programme, with excellent subsequent career options.

OTHER ITEMS

The programme will involve an internship, either in an industrial/ NHS setting or as a three months' research visit in a collaborating laboratory (the CDT bid assembled a large body of potential industrial/ academic collaborators who confirmed their interest). It is expected that such internship/ visit will likely take place in the second year of PhD.

This section ca include other distinctive features of the programme, e.g.

- *Methods for evaluating and improving the quality and standards of teaching and learning*
- *Opportunities for placement of overseas study*

ABOUT THE PROGRAMME

ADDITIONAL REQUIREMENTS

PRSB Accreditations (where relevant)	<i>Please note accreditations awarded or planned</i>
Admissions requirements Before completing this section please contact a member of the Recruitment and Admissions team for further guidance.	Students enrolling on the PhD programme must have successfully completed the MSc by Research in Biomedical AI (first year of the CDT programme), normally obtaining an average final mark of at least 65% and showing aptitude for research in the MSc project. Students will also be required to complete a PhD proposal during the first month of the programme, to be assessed by the supervisory panel and signed off by CDT management
To be completed by R & A Team	<i>Please select to confirm that a member of the R & A section have consulted on the Admissions requirements.</i> <input type="checkbox"/>
Work experience/work based learning opportunities	<i>Details of organised work experience / work based learning opportunities available during the programme (if applicable)</i>

CONSULTATION

Student body	<i>In addition to the consultation process at Stage 1 please provide a full summary of the consultation undertaken and the impact this has had on the development of the programme</i>
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External Review/Critical Friend	The proposal is currently subject to external peer review as part of the UKRI selection process. We will take into account any comments regarding the programme received from reviewers and during the selection interview.
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ADDITIONAL DOCUMENTS	
Memorandum of Agreement (if applicable)	
Award letter (if applicable)	
DPT (please use your current template)	

APPROVAL

Programme Title:	PhD in Biomedical Artificial Intelligence
Programme Proposer:	Prof Guido Sanguinetti

STAGE 1: SCHOOL BOARD OF STUDIES REVIEW AND APPROVAL

Confirmation of approval of the proposal at the School Board of Studies should be entered below.

Date of BoS:
Convener Name:
Comment and Approval (BoS Minute): <i>Please provide either a link to the minutes of the Board or a copy of the relevant text from the minutes.</i>

STAGE 2: HEAD OF SCHOOL REVIEW AND APPROVAL

Head of School: <i>Please print name</i>
Comment and Approval:
Signature:

STAGE 3: COLLEGE CURRICULUM APPROVAL BOARD REVIEW AND OUTCOME

Date of CCAB:
Convener Name:

Stage 2 Outcome (please select as appropriate)	
Proposal approved ➡ Proceed to <i>New Programme Request & DPT creation</i>	<input type="checkbox"/>
Proposal approved with conditions	<input type="checkbox"/>
Proposal rejected with recommendations	<input type="checkbox"/>
Proposal rejected	<input type="checkbox"/>
Comment:	

DOCUMENT CHECKLIST

Document	Completed
DPT	<input type="checkbox"/>
Memorandum of Agreement (if applicable)	<input type="checkbox"/>
Assessment Matrix	<input type="checkbox"/>
Award letter (if applicable)	<input type="checkbox"/>