



The University of Edinburgh

EPCC

### **EPCC MSc Summer Dissertation Projects 2019-20**

We are inviting local companies to participate in our Summer Dissertation Projects Programme for Masters students in 2019-20. Today, students and employers increasingly expect an element of workplace experience during postgraduate studies to complement academic achievement. Our aim is to ensure that all our graduates have an opportunity to undertake work-based projects to give them the experience and workplace skills needed to enhance their employability.

The aim of the **MSc Summer Dissertation Projects Programme** is to provide students with the opportunity to:

- tackle a real-world industry project using their academic knowledge in a work context
- enhance awareness that skills and knowledge gained in a workplace environment are as relevant and valuable as those gained in an academic setting
- learn about local companies and explore potential career paths

Companies participating in the **MSc Summer Dissertation Projects Programme** can benefit in a number of ways:

- opportunity to meet a group of high calibre, talented students across a range of Masters programmes with a view to recruitment
- opportunity to undertake research projects in a cost-effective way with access to our world leading supercomputing facilities
- develop new links with the University
- potential for further developing any promising output on an ongoing basis with EPCC via various means, e.g. KTPs

The timetable for the 2019-20 Programme is outlined below:

- September 2019: Students start MSc courses, including the "Project Preparation" course.
  - Mid-October 2019: EPCC contacts/initial supervisors assigned. Projects released to students.
  - 31 October 2019: Final deadline for companies to submit project proposals (recommend skeleton proposal submitted by 15 October so student are aware).
  - Late-October-November 2019: Companies invited to present projects to students as part of "Project Preparation" course (either via presentation or 'roadshow' format) and undertake pre-selection processes with interested students (e.g. via informal interviews).
  - Early-Mid November 2019: Students submit their project preferences.
  - Before Winter break: Student project allocations confirmed by Programme Team.
  - January-April 2020: Students undertake the main part of the "Project Preparation" course module that includes background reading and refinement of project with their supervisors.
  - Mid-late May 2020: Students complete Semester 2 Examinations. Students expected to start working full-time on their Dissertation Projects from this point (through progression to MSc not confirmed until the Board of Examiners).
  - Early-Mid June 2020: The MSc Board of Examiners confirms students' eligibility to proceed to MSc level (i.e. undertake Dissertation Project).
  - Late-August 2020: Students submit their MSc dissertations according to University guidelines.
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## **Frequently Asked Questions**

We have prepared the following FAQ to assist you in assessing your interest to participate further in the Programme, and answer any initial questions you may have.

### **What sort of projects can Masters Students do?**

The dissertation project is primarily a scholarly activity demonstrating that the student “can show proficiency in research and/or analytical skills relevant to advanced work in the discipline”. This is a broad remit and there is scope for a wide range of project activities, from academic research through to applied development. Our students can contribute a wide range of skills and knowledge to suit many different projects and working environments. Our students are of a high calibre and will normally have completed an undergraduate degree with a minimum entry requirement of a UK 2:1 honours degree or international equivalent qualification.

Students from two Masters Programmes at the School are eligible to participate:

- High Performance Computing
- High Performance Computing with Data Science

You can propose:

- a specific project title or topic for the student to deliver
- a general idea of a business need which requires further development
- a core research theme to be developed by the student into a bespoke project
- an intended outcome for your company leaving the design of the research entirely to the student

For example, we expect that projects could involve:

- large scale data analysis and interpretation
- mathematical and computational modelling
- parallelisation of computationally intensive operations
- porting of application code to a parallel system
- performance analysis of an existing application
- optimisation problems
- “big data” problems and data mining
- other in-depth assistance in your research & development

The only conditions are that the proposed project is sufficiently in-depth and with sufficient scope to meet the academic standards and requirements at Masters level . Once you have proposed a suitable project topic or theme we will work with you to develop it, and try to match it with an Academic Supervisor.

For further information regarding the programme structure of each Masters programme, please refer to Appendix A towards the end of this document.

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### **Is this a type of work experience?**

Work-Based Projects are very different from “work experience”. Students are expected to undertake a well-specified, dedicated project which is written up as a dissertation that will contribute to their overall assessment for award of a Master’s degree. It is important to both the student and the University that our partner companies participate fully in the execution of the project.

### **Can we interview potential students and select the best?**

Companies will be offered the opportunity to undertake a pre-selection process in advance of students making project selections. Alternatively, you can request us to nominate a suitable student.

Pre-selection is preferred to interviews after project selection as, due to time constraints around coursework deadlines and exams, the appropriate scheduling of interviews in late-November/December is extremely difficult. It also enables companies to get a sense of the strengths and weaknesses of students early to potentially tweak projects, while ensuring that students don’t ‘waste’ project choices on competitive projects for which they are not well suited.

The short-listing and allocation process undertaken by EPCC is:

- All students will be given a choice of projects. This list of all projects offered to students will be a mix of pure academic projects and Work-Based Projects.
- Students will express their project preferences (usually making 4 choices).
- Allocation of Work-Based Projects will then be assessed on a competitive basis following an evaluation by academic staff that the student has the skills & experience to undertake their preferred project(s).
- Assuming that multiple students select the same Work-Based Project and are suitable, then you will be given the opportunity to choose between them based on performance in any pre-selection activity and based on provisional academic results available at that stage.

### **If we agree to participate, are we guaranteed to have our project undertaken?**

Unfortunately we cannot guarantee this. There are a number of reasons why a project proposed by a company might not be undertaken in practice:

- A final project agreement cannot be reached e.g. topic is not suitable in terms of focus & scope for a Masters dissertation or a suitable Academic Supervisor cannot be identified.
- No students choose the project, or the Programme Coordinator/Academic Supervisor feels the student does not have the skills & experience to complete the project successfully.
- A student who is selected from the project does not progress to the dissertation stage of the Masters either due to poor academic performance in Semester 2 or due to withdrawal/interruption of study (these are extremely rare occurrences, but it is possible).

It is our intention to work pro-actively with companies to avoid such situations, or identify any misalignments as early as possible.

### **Will students require a lot of supervision?**

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Each student undertaking an industry project will have an Academic and Industry Supervisor. It is important that the Supervisors are aligned with regard to directing the project, and communication between the Supervisors is excellent so the student receives consistent feedback.

The guideline for academic supervision effort is up to 32 hours during each project. The level of engagement from the Industry Supervisor is flexible and will be agreed on a case-by-case basis. The effort could range from acting as a technical advisor/mentor through to full joint supervision.

We would normally expect the Industry Supervisor to:

- oversee the project delivery and provide technical guidance and mentoring
- provide the student with a project briefing and expected outputs
- ensure the student is aware of, and complies with legal requirements related to being based in the workplace (if applicable).

The Academic Supervisor is required to:

- be available throughout the project for input,
- ensure the project is on track via regular contact with the student,
- oversee the write-up phase,
- undertake the final project assessment.

### **What will it cost me?**

Masters students do not require a salary payment as the project is an inherent element of their degree programme and there should be no significant expenses associated with Work-Based Projects with local companies. Any additional expenses or costs can be discussed on a case-by-case basis.

Additional discretionary payments to the student are not uncommon, however, this is not expected and any agreement would be between yourselves and the student. In recent years some industrial partners offer a student a small scholarship as an incentive to attract the best students on the programme (paid directly to the University and deducted from student fees, where the student does not have full funding from another source).

The general rule-of-thumb is that the more you are able to put in, the more you are likely to get out. Some industrial projects can be extremely hands-off where a problem or dataset is handed over to an academic supervisor and there is little interaction with the company thereafter, while others may involve a much closer relationship, potentially with the student working full-time or part-time within the company.

### **Where will the student work?**

There is flexibility in the location of the work depending upon the nature of the project. There is no absolute requirement for a student to be located full-time during their project at the company offices, although we would encourage that to ensure that the student gets the most from the experience. If more convenient, the student can attend your offices for progress meetings and conduct the bulk of project work at the University. If the student is spending a lot of time within your

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organisation then they would require a working area and the equipment/resources necessary to undertake the agreed project successfully. During the write-up phase, the student would normally return to the University to make Academic Supervision of this phase more convenient.

**Can we propose multiple projects?**

Yes! We would be happy to develop proposals for multiple project topics and then assess student demand to undertake them. We are flexible with regard to the level of detail and size of proposal that you make. It is not unusual for initial project proposals to be relatively speculative, and the student can use the “Project Preparation” course module to develop the proposal into its final form ready for undertaking in the summer. Previous examples of project proposals can be provided on request. We will generally recommend that students only apply to a single project per-industrial partner if more than one project is put forward.

**Is there a formal project agreement?**

Yes, the understanding between the company, University and student are set out in an Agreement that is signed by all parties prior to the commencement of the project to ensure all key parameters are clear and understood. For example:

- project title, start date and delivery deadline
- project outputs
- location
- operating procedures and workplace regulations
- Intellectual Property rights, non-disclosure agreements and ownership on completion

The student is responsible for project completion and delivery to meet the agreed deadline. Assessment of the final academic output remains the responsibility of the University.

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## **Appendix A: MSc Programme Structures**

### **MSc in High Performance Computing & MSc in High Performance Computing with Data Science**

The MSc in High Performance Computing (HPC) is a well-established taught Masters programme run by the Edinburgh Parallel Computing Centre (EPCC) at the University of Edinburgh. EPCC is the major provider of HPC training in Europe with an excellent international reputation for education and research. The MSc in High Performance Computing with Data Science was launched in 2014 in direct response to the demand for graduates with both HPC and Data skills from business and science.

Many students taking these courses have a first degree in computer science; most others have degrees in physics, maths or engineering. An increasing number have some previous work experience, typically in software development roles, and are taking the MSc to enhance and extend their skills. All students are competent programmers in at least one of C, C++ or FORTRAN as these languages are used for assessment on the MSc programme. Python and Java are also accepted for entry to the MSc Programmes, but usage while on the MSc programmes is not necessarily extensive for all students.

#### **Compulsory courses for both MSc programmes:**

- Message-Passing Programming
- Programming Skills
- Threaded Programming
- Software Development
- Project Preparation

#### **Optional courses for both MSc programmes:**

- Design and Analysis of Numerical Algorithms
- Numerical Algorithms for HPC
- Advanced Parallel Techniques
- Advanced Message-passing Programming
- Parallel Design Patterns
- Performance Programming
- Selected courses from other University of Edinburgh MSc programmes in Computer Science, Informatics, Data Science, Artificial Intelligence, Mathematics and Physics at the University are also available as optional courses.

#### **Compulsory course for the MSc in HPC**

- HPC Architectures

#### **Compulsory courses for the MSc in HPC with Data Science**

- Fundamentals of Data Management
  - Data Analytics with High Performance Computing
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