

Guidance for industrial collaboration on Undergraduate group projects

Introduction

The Department of Computer Science provides three undergraduate Bachelor's degrees; an MA in Computer Science, MA in Maths & Computer Science and MA in Philosophy & Computer Science. All three degrees include a group design practical in the second year, providing an opportunity for industry to work alongside undergraduates on an extended project. Students are grouped into teams of 5 or 6 and choose from projects jointly supported by an external (industry) supervisor and an internal (academic) supervisor from the department.

Group projects allow students to experience working to deadlines, and also working with a team of colleagues not of their own choosing to complete a fixed project. The projects provide an awareness of problems encountered in professional practice and as such, students are expected to exhibit professional skills in design, quality and management. Students also need to demonstrate that work is carefully planned, that components and systems are properly tested, and that they collaborate effectively as a functional team, as this forms part of their assessment by their internal (academic) supervisor.

The projects are frequently described as highly rewarding and as a useful tool for recruitment by industry supervisors as they work closely with a group of students who have chosen to work on their project as they share an interest in a particular market sector. Industry supervisors frequently acknowledge the value of the interaction with students and the increased exposure amongst the current student cohort and academic staff.

Undergraduate group projects culminate in a presentation day where students present their software solutions in the beautiful surroundings of Oxford's Museum of Natural History followed by a drinks reception, the awarding of prizes, and the opportunity for all involved to network and make new contacts. Industry supervisors wishing to provide prizes for the best groups should discuss this before the culmination of the projects. We are happy to use our social media channels and website to publicise named prizes and association with the department.

Collaborating on undergraduate student projects

Collaboration on an undergraduate group project is an undertaking that will be as unique as each student studying for the degree. This guidance is designed to answer common questions around the process, and explain the expectations of external (industry) supervisors.

When initially discussing projects, the first step will be submission of a project proposal, a short summary taking into account the advice and examples detailed below. Proposals are then reviewed by the lead academic to determine that the scope meets the requirements of the department. Where proposals need amending, this will be done in consultation prior to offering to student groups. Agreed proposals are subsequently collated and made available to students to review and choose from.

The structure of the Undergraduate group projects means that all projects are offered to all student groups, who will ultimately choose a project that best fits their collective research interests. Student

groups are asked to choose three potential projects with the final allocation being completed by the committee, allowing for a well distributed network of supervision. It must be noted that as students have free choice to select their project shortlist, there is **no guarantee that a proposed project will be chosen** in the current academic cycle. Multiple student groups may be interested in the same project, and it is possible (although not mandatory) for industry supervisors to take on multiple groups for the same project. Each student group will also be allocated an independent academic supervisor whose role is to ensure adequate progression and team work through the project rather than to provide technical input. For industry supervisors who may be supervising multiple project groups it is also important to allow each group to work on an *individual* solution to the problem rather than allowing collaboration and cross seeding of ideas/methodology. This will allow final judging of the projects to be completed on the singular merits of each group.

Timeline and key dates

The table below outlines the key periods for group projects (exact dates are subject to change annually). As a co-supervisor it is important that you are also aware of these stages.

November – December	Project proposals submitted by industry partners and collated
January	Projects offered to student groups and shortlists submitted
February	Projects allocated and students to set up initial meeting with industry supervisors
February-April	Projects ongoing alongside normal teaching and lectures – progress meetings can be scheduled
May	Presentation day – culmination of group projects with awards for best groups.

Project proposal guidance

The premise of group design practical projects is that the industry supervisor is acting as a ‘customer’ or ‘client’, instructing a group of developers or ‘contractors’ to produce a software solution to the problem they set. The start of this process is the submission of a project proposal by the ‘customer’.

Project proposals are short descriptors of the intended project goal and should give a possible route as to how the project can be completed. It is important to ensure that the description conveys the novelty or excitement of the project and illustrates why students should choose to undertake it. Some examples of recent successful projects are in the FAQ section below.

Industry supervisors should be aware when proposing a project of the expected time available for the student group to complete it. The practical exercise is anticipated to take 20-30 hours, therefore for a group of 6 students this equates to up to 180 hours of work over the full duration (approximately 3 months), with scheduling and work allocation to be undertaken by the students between themselves.

A good project proposal will allow room for interpretation by the students although must appear achievable. Previously we have had project descriptions that have not been chosen as the scope was too wide open as to appear daunting to students.

If you would like to discuss a proposal informally prior to submitting it, please contact industry@cs.ox.ac.uk

Expectations of industry supervisors

Supervision of undergraduate projects is a very rewarding process and one where strong ties can be made with the student community and in particular with the students working directly on a particular project. We encourage students to make the most of the industry connections during the projects and it is certainly true that the more interaction students and supervisors have, the greater the benefit however, there is a minimum expectation outlined below which roughly equates 5 hours of input to include 3 meetings, outlined below, over the 3-month project duration. It is important to keep in mind however, that **it is the responsibility of the student team to drive the project and organise meetings**, requesting help from their industry/academic supervisor as necessary.

- An initial 'briefing on the project' meeting with the external (industry) supervisor. This meeting serves the purpose to define all project related (technical) details, which naturally complement information already provided in the short project proposal submitted by the company. At this meeting the team should agree what they will be delivering, and when. At this point the student team will also agree with their internal (academic) supervisor a plan for how they will achieve it.

Following this meeting, the student group and the external (industry) supervisor keep in contact regarding the technical evolution of the project through further meetings using their preferred communication channel and any mutually agreed time points.

- A progress report meeting after the first 2 weeks (approximately) of the project. At this meeting, they'll present a progress report on their module implementations, test plans and test results. The team may instead provide a brief written report on their progress by the end of Hilary Term, if agreed with their supervisors.
This meeting is also a good point to negotiate changes to the scope or timeline for what they are delivering (if for example it turns out that their project is significantly harder than originally expected, they can negotiate to reduce the scope). It is absolutely fine for teams to change the scope of what they're delivering as long as the industrial and academic supervisors have reasonable warning (while it is absolutely not fine for example for the team to propose a reduction in scope 24 hours before the final delivery date!)
- A delivery meeting in Week 2 of Trinity Term. At this meeting student teams deliver the agreed project including the product, installation instructions, documentation, etc. as previously agreed.

The student teams will also have review meetings with their internal academic supervisor to provide an opportunity to monitor group progress and for general discussion, but academic supervisors will not be expected to provide technical advice or resolve technical issues. The responsibility for organising and completing the work lies squarely with the students. It is entirely acceptable for additional interaction over and above what is described above, through mutual agreement. Final software solutions are presented to the student's peers, members of faculty and industry supervisors at a presentation day.

Presentation day

The culmination of the group projects is a presentation day where all students present and display their final software solution to their peers and all those involved in the projects as a whole. The presentation day is split into three sessions throughout a full day, and we encourage all industry supervisors to join us. It can be a great networking opportunity as well as a rewarding conclusion to the projects, and is usually held in the stunning surrounds of Oxford's Museum of Natural History.

- For the first session, students are provided with space to demonstrate their software solution and we encourage everyone attending to visit student stands to interact with and quiz them on their final product.
- Students are also asked to give a presentation describing the project brief, their interpretation and solution including any learning opportunities they experienced along the way
- The final part of the day is a drinks reception where students and industry supervisors can discuss their experiences. During this time the judging panel will discuss students' final solution and presentations and present the winning groups with their prize. Prizes are typically offered for best overall group, best presentation and most innovative solution. We are happy to consider prizes for additional categories should an industry supervisor be willing to offer them.

Frequently Asked Questions

Do we need to provide technical guidance to students?

The expectation of industry supervisors who submit a project proposal is that they will have a firm understanding of the task being asked of the student team and as such would be able to provide support to the students who may need to ask technical questions during the course of the project. The internal (academic) supervisor, in these projects, is responsible for ensuring that students are working effectively as a team and are all contributing suitably to facilitate a successful outcome rather than providing specific technical input. Academic supervisors are not expected to have sufficient knowledge of the application domain, for a project they have not proposed, to contribute meaningful technical support to an ongoing project.

What expertise will students have coming into the projects?

Our students are exceptional individuals who have a solid grounding in Computer Science that can be applied to a multitude of scenarios. However, they cannot be expected to have prior experience in the application domain of a specific project. It is expected that some application specific guidance can be provided or discussed with the team should it be required. For details of the course structure and modules covered by students prior to the group projects please see the link below;

[Department of Computer Science, University of Oxford](#)

We are very happy to discuss project scopes informally with potential industry supervisors prior to being offered to students to ensure projects are appropriate and proportionate to the departmental expectations of students.

What about Intellectual Property (IP) consideration?

Projects offered to students should be submitted on the understanding that the student group is extremely unlikely to produce software of commercial value. We unfortunately do not have the resources to negotiate IP ownership for these short projects.

Can I make the students sign an NDA whilst collaborating on a project?

NDA's can be reviewed on a case by case basis although it is considered highly unlikely that they will be needed as the majority of industry supervisors will use data and resources that are not commercially sensitive. We will not accept projects that require students to sign contracts as individuals. Any requirement for an NDA or similar should be signed by the University signatory on behalf of the students.

How much time do I need to dedicate to the project?

Collaborating on group design practical projects should be relatively light touch as there are only three mandatory meetings required (an initial exploratory meeting to define the expected outcomes of the project, a progress meeting and a delivery meeting). The minimum expectation therefore equates to around 5 hours of time spent with students over the 3 month project duration. Of course we are fully supportive of further meetings and note that generally the most successful projects are those where there has been good engagement with regular progress meetings between students and collaborators. It is important to remember however, that the onus is on the student group to initiate meetings and schedule meetings as required.

Do I need to review and provide feedback on the final written report?

Student assessment is completed by their internal (academic) supervisor although it is anticipated (not required) that industry supervisors will provide feedback either through discussions with the academic supervisor or through written communication that can be used to support the grading process.

Do I need a technical background or deep understanding of Computer Science to act as an industrial supervisor in these projects?

As an industry supervisor your role is to act as the 'client' and as such would define the scope of the intended software solution that the students (acting as the consultants) will produce. It is expected that you will be able to provide technical input given the particular application domain as it is unlikely the internal (academic) supervisor would be familiar with this.

How many spaces are available at the presentation day for colleagues?

We are very happy to accommodate two representatives from each company collaborating with student groups however, if you would like to bring more than two we will ask for a contribution to the increased cost of hosting and catering the event.

Can I see some example project proposals to understand how to pitch to project?

Recent projects that were well received by students are as follows. Please contact us if you have a project idea and would like advice on how to best frame it as a group project.

Proposal Example 1

Autonomous Economic Agents (AEAs) encapsulate the functionalities of an autonomous software agent. However, it is up to the developer of an AEA to decide how intelligent their AEA is going to be.

In this project, you are required to create a collection of (almost) zero-intelligence AEAs who achieve tasks which a) none of the agents in isolation could achieve, and b) it would be extremely difficult to develop a single sophisticated, (super) intelligent AEA that could achieve those tasks.

The project participants must quantify the difficulty of solving tasks using a swarm of zero-intelligence AEAs versus a single sophisticated AEA, and make suggestions for the AEA architecture to follow, if one is to implement either of the two approaches, in general settings.

Proposal Example 2

When people browse social media sites on their phones for hours every day, most of the CPU power goes unused. The old desktop equivalent of this problem was the screensaver, which did little of value until it was co-opted for distributed computing projects such as SETI@home. Your task is to make a platform that can perform useful computation in the background on a large number of mobile phones, while the owners are on social media - or even while they are asleep. It will have to run cross-platform, perhaps using JavaScript, but must also give the appropriate incentives to users - will it drain batteries or incur network charges? If so, what kind of application would customers pay to run on such a platform? Would phone sensors offer any specific value? You need to demonstrate an end-to-end solution including servers, mobile clients and an example application, keeping in mind the security implications if either customers or phone owners try to cheat the system.

Proposal Example 3

A software telecoms company are looking for ways to attract and identify new technical talent. They're looking for some kind of game or puzzle that will run in a web browser, with twin underlying goals of (a) get lots of students interested in and applying to the company and (b) automatically flagging any particularly good looking candidates to the company to fast-track to interview. The company has some ideas for puzzles and games that might work, but are open to ideas and suggestions from the consultants (you!) - they're really looking for something with wow factor. There's no restriction on the set of languages/packages/back-end that you use.

In addition, the video submissions of the 2021 cohort can be viewed at the following link, again providing guidance as to what a successful outcome can look like.

[Group Design Practical \(ox.ac.uk\)](https://www.ox.ac.uk/group-design-practical)

For any questions or informal discussions of project proposals please email industry@cs.ox.ac.uk