Contents

• Project Timeline
• Research Skills
• Project Interviews
• Project System
• Project Types (I, II, III)
• Important Considerations
• Finding ideas
• Example Theses

NOTE: I expect you to follow the links in the slides!
The image contains a project timeline with various stages and deadlines. The timeline is divided into different sections:

1. **Project proposals**
2. **Project interviews**
3. **Project specification (Research Skills)**
4. **Project execution (Individual Project)**
5. **Project writeup**

Each section is further divided into months from December to September. The key dates and tasks include:

- **Project allocation**
- **Lit-list**
- **Synopsis**
- **Workplan**
- **Peer marking**
- **Progression**
- **Research review**
- **Thesis**
- **Poster demo**

The timeline also includes specific dates for each project phase, such as TB 1, CV, JAP, TB 2, EV, TB 2, SRW, SAP, and AS. The full URL provided in the image is:

https://www.cs.bris.ac.uk/project/MSc/
A note on Progression

• Marks for taught units are considered by an exam board in June and the results will be announced at the end of June

• If you fail any units you won’t normally be allowed to start your project until you have passed any resits in September
  – this is official university policy!

• In this case, you will give your poster/demo in late December and submit your thesis in mid January
  – This will delay your graduation!

https://www.bris.ac.uk/engineering/currentstudents/gradschool/summerresults.html
# Research Skills

<table>
<thead>
<tr>
<th>Week</th>
<th>Starting Date</th>
<th>Activity</th>
<th>Slot 1 (Tue)</th>
<th>Group Sessions (Wed/Thur/Fri)</th>
<th>Slot 2 (Fri)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>25 Jan</td>
<td>Finding a project</td>
<td>Intro to Research Skills</td>
<td>Finding a Project (unallocated students)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>1 Feb</td>
<td>Finding a project</td>
<td>Writing a synopsis</td>
<td>Be accepted by a supervisor</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>8 Feb</td>
<td>Researching your project</td>
<td>Draft synopsis</td>
<td>Discussion on Synopsis</td>
<td>Questions on Synopsis (optional)</td>
</tr>
<tr>
<td>16</td>
<td>15 Feb</td>
<td>Researching your project</td>
<td>Answers on Synopsis</td>
<td>Revised Synopsis</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>22 Feb</td>
<td>Researching your project</td>
<td>Writing a Literature List</td>
<td>Intro Typesetting in LaTeX</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>29 Feb</td>
<td>Researching your project</td>
<td>Draft Lit List</td>
<td>Discussion on Lit List</td>
<td>Getting Ethics Approval</td>
</tr>
<tr>
<td>19</td>
<td>7 Mar</td>
<td>Researching your project</td>
<td>Answers on Lit List</td>
<td>Using Library Resources</td>
<td>Revised Lit List</td>
</tr>
<tr>
<td>20</td>
<td>14 Mar</td>
<td>Drafting your report</td>
<td>Writing a Workplan</td>
<td>Writing a Research Review</td>
<td></td>
</tr>
<tr>
<td>EV1</td>
<td>21 Mar</td>
<td>Drafting your report</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EV2</td>
<td>28 Mar</td>
<td>Drafting your report</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EV3</td>
<td>4 Apr</td>
<td>Planning your project</td>
<td></td>
<td>Draft Plan</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>11 Apr</td>
<td>Planning your project</td>
<td>Writing, Citing &amp; Plagiarism</td>
<td>Discussion on Plan</td>
<td>Questions on Plan (optional)</td>
</tr>
<tr>
<td>22</td>
<td>18 Apr</td>
<td>Writing your report</td>
<td>Answers on Plan</td>
<td>Draft Review</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>25 Apr</td>
<td>Writing your report</td>
<td>Evaluation?</td>
<td>Discussion on Review</td>
<td>Questions on Review (optional)</td>
</tr>
<tr>
<td>24</td>
<td>2 May</td>
<td>Writing your report</td>
<td>Answers on Review</td>
<td>Final Review</td>
<td></td>
</tr>
<tr>
<td>SRW</td>
<td>9 May</td>
<td>Peer Marking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SA1</td>
<td>16 May</td>
<td>Peer Marking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SA2</td>
<td>23 May</td>
<td>Peer Marking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SA3</td>
<td>30 May</td>
<td>Project Execution...</td>
<td></td>
<td>Peer Marking (x2)</td>
<td></td>
</tr>
</tbody>
</table>

[Link](https://www.cs.bris.ac.uk/Teaching/Resources/COMSM2202/)
Project Interviews

• You should start thinking about your project in TB1 as you must find a supervisor by wk14 at the latest

• This is a competitive interview process so you will need to go prepared and be able to sell yourself

• All students need to define their own project using the skills they will learn on Research Skills unit

• But staff will help you to get started by putting some initial draft proposals into our Project System

• Students really need to be proactive in all aspects of their projects (self-motivation is the key to success)

• Start approaching staff as soon as possible; don’t get left behind

https://www.cs.bris.ac.uk/project/MSc/interviews.html
Project ideas will be added by staff in weeks 11 and 12!

https://wwwa.fen.bris.ac.uk/COMSM2202/projects/index.jsp
Project Types

• **Type I: Implementation** – build a **novel** piece of **software / hardware** using **concepts** from Computer Science. The added value will mainly come from the design and evaluation.

• **Type II: Investigation** - work on an open **research problem** to find new **results** or new **methods**. The added value will come from the analysis of requirements, design and evaluation.

• **Type III: Theory** - developing **models / theories** to explain an idea in Computer Science. The added value will come from the **mathematical** analysis above that already in the literature.

• Any combinations of the above!

[https://www.cs.bris.ac.uk/project/MSc/MScProjectGuidelines.pdf](https://www.cs.bris.ac.uk/project/MSc/MScProjectGuidelines.pdf)
Important Considerations when choosing a project

• CV/Portfolio - What do you want to do in the future?
• Passion – Which topics do you enjoy the most?
• Skills – What are your strengths and weaknesses?
• Personality – Which members of staff do you get on with?
• Ownership – You must take responsibility for your project!
  – Regularly check the projects list and do some background reading
  – Contact the supervisors: email them; go to their office, talk through the project; demonstrate your understanding; be willing to contribute your thoughts on the directions the project could take
  – Remember most projects can be adapted to suit your interests and skills; most projects will evolve over time anyway
  – Remember other projects can be suggested; you are encouraged to propose your own ideas, but you must find a supervisor to champion them
## Finding Ideas: PhDs

<table>
<thead>
<tr>
<th>Dr Dan Page</th>
<th>Cryptography</th>
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</thead>
<tbody>
<tr>
<td><strong>Novel side-channel attacks and countermeasures</strong> (e.g., non-deterministic processor designs, attacks using cache memory as a side-channel).</td>
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</tr>
<tr>
<td><strong>Domain specific compiler/language support for cryptography</strong> (e.g., optimisation of ECC, automatic countermeasures against side-channel attack).</td>
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</tr>
<tr>
<td>I am also interested in the design of (general purpose) processors, compilers and programming languages.</td>
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</table>

<table>
<thead>
<tr>
<th>Prof Dhiraj Pradhan</th>
<th>Microelectronics</th>
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<tbody>
<tr>
<td>The primary technological motivation for my research is the current power crisis in embedded systems and soft-error tolerance. Limitations on battery life and ever increasing computational demands on mobile computing result in a dramatic power mismatch in today’s technology. Moreover, system-level soft error has become an increasingly important issue. My research has a direct impact on technology and society. Due to the evolving next generation information processing systems, one of the challenges that we face is how efficient and scalable these highly sophisticated applications and their corresponding systems are and what can be done to optimize them using heterogeneous cores including ASICs. We aim at solving that issue. Also our research seeks to design heterogeneous and fault tolerant many-core architectures which will allow for the energy efficient exploitation of parallelism.</td>
<td></td>
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</table>

<table>
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<tr>
<th>Dr Chris Preist</th>
<th>Interaction &amp; Graphics</th>
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<tbody>
<tr>
<td>Projects addressing social or environmental sustainability challenges, including but not limited to: - Agent based simulation for design of environmental policies or strategies - The use of mobile apps and social media to engage communities with environmental or social issues, both design of the intervention and assessment of its effectiveness in the community. This is of particular interest to the Environment Agency, who we work with. - The use of government environmental open data possibly incorporating semantic web technology. I am strongly motivated by engagement with external companies and NGOs to make projects real world and have extensive contacts to make this happen. Please note I am not taking on new PhD students currently.</td>
<td></td>
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<thead>
<tr>
<th>Dr Oliver Ray</th>
<th>Intelligent Systems</th>
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<tbody>
<tr>
<td>My main academic focus is on: - Artificial Intelligence tools for the automation of scientific inference (especially of <strong>abductive</strong>, <strong>inductive</strong>, and <strong>metalogical</strong> inference) - Biological applications of Artificial Intelligence (especially to <strong>symbolic systems biology</strong> and <strong>social insect modelling</strong>) - Other applications of Artificial Intelligence (especially to <strong>energy-aware</strong> software compilation, quantitative inter-comparison of <strong>climate models</strong>, and <strong>legal reasoning</strong>)</td>
<td></td>
</tr>
<tr>
<td>I also have strong interests in: - Quantitative analysis of <strong>sports performance</strong> (especially for power-lifting, olympic-style weightlifting, and triathlon) - Audio-visual tools for <strong>social dancers</strong></td>
<td></td>
</tr>
</tbody>
</table>

[https://www.cs.bris.ac.uk/admissions/phd/projects/phd-projects.jsp](https://www.cs.bris.ac.uk/admissions/phd/projects/phd-projects.jsp)
Projects with Oliver Ray

Knowledge Discovery Workbench for Structured Data

Most machine learning methods still treat examples as simple feature vectors over a fixed set of attributes. But, real data has a much richer structure which cannot be captured in this simple attribute-value paradigm. Recently this has motivated a number of “relational” machine learning methods for dealing with structured data. So far, there has been very little work in defining data formats or algorithmic protocols that would allow such methods to be effectively and cooperatively used within a common environment for structured knowledge discovery.

This project is motivated by the vision of providing a graphical workbench to support relational data mining and inductive logic programming workflows by generalising the successful Weka toolkit for attribute-value learning. The focus of the project can be tailored to the interests of the student but will include some of the following:

1. specifying a standard file format for data in multi-relational and/or clausal representations;
2. validating the file format by encoding data sets with a different structure (e.g., mutagenesis);
3. implementing or writing wrappers for two or three structured machine learning algorithms (e.g., Progol);
4. developing a graphical interface to facilitate the interoperation of algorithms and data.

The idea is for the proposed file format to capture a significant core of the representational expressivity employed by current structured learning techniques. By writing suitable data conversion scripts, this would allow the same data to be used by multiple structured learning methods. The graphical environment could be based on an existing metaphor such as Weka, Yahoo Pipes, or something entirely new. The implementation could concentrate on writing parallel versions of the algorithms to be used on Blue Crystal.

Video Analysis Tool for Barbel Weightlifting (to be co-supervised by someone in the vision group)

Barbell weightlifting is an essential component of many training programs for fitness, athletics, body-building, and power-lifting. There are many styles of lift ranging from the two specialized olympic-style lifts known as the snatch and the clean and jerk to the more general deadlifts, squats, and press that are commonly practiced in many gyms. Correct form in all those lifts is essential to prevent injury and maximise strength gains. The classic book “Starting Strength: Basic Barbell Training” is widely recognised as an authority on the execution of the squat, bench press, deadlift, press and power clean. Unfortunately these lifts are typically performed incorrectly due to lack of awareness of proper form and lack of access to qualified trainers.

https://www.cs.bris.ac.uk/project/ideas/staff.html
Finding Ideas: Staff Homepages

http://www.cs.bris.ac.uk/~oray/
Finding Ideas: Staff Publications

https://scholar.google.co.uk/citations?user=3vwgzIUAAAAAJ&hl=en
Finding Ideas: Research Groups

- Cryptography
- Robotics
- Interaction and Graphics
- Theory and Algorithms
- Intelligent Systems
- Visual Information Laboratory
- Microelectronics

http://www.bris.ac.uk/engineering/departments/computerscience/research/
Finding Ideas: ...

- There are limitless places to find ideas for projects; if you’re struggling to find ideas then you are simply not looking hard enough (try looking behind you!)

- Make sure you’ve got ideas to talk about **before** you visit academic staff; you should primarily be telling them what value you can add to them, not expecting the opposite

- Only approach staff that you have some reason to believe will be interested in your idea; do your research and find out more about potential staff and topics

- Please don’t expect me to critique ideas in areas that I know nothing about; its not my job to put you in touch with relevant staff - it’s you job to find out who they are
The Bottom Line

• The task of specifying a good MSc project is a continuous process of refinement that requires a significant amount of effort and background knowledge.

• It is simply not practical for staff to formalise all of the ideas or interests they have, so there is no substitute for doing your own research and going to talk to staff in person.

• The best projects will most likely be done by students who are already thinking about their projects and talking to staff (i.e. taking responsibility without being told what to do).

• SO GET OUT THERE!
Some Example Projects

After the lecture I described several MSc projects that I have supervised in the area of social insect behavior and energy aware compiler tuning. You can find pdfs of those theses at the following links (along with some new projects I’m offering):

https://sites.google.com/site/computationalantlab/home
http://seis.bris.ac.uk/~cb0094

There are also some example first class theses available at
https://www.cs.bris.ac.uk/project/MSc/info.html
THE END