Disclaimer

This document was published in September 2017 and was correct at that time. The Department* reserves the right to modify any statement if necessary, make variations to the content or methods of delivery of programmes of study, to discontinue programmes, or merge or combine programmes if such actions are reasonably considered to be necessary by the College. Every effort will be made to keep disruption to a minimum, and to give as much notice as possible.

* Please note, the term ‘Department’ is used to refer to both ‘Departments’ ‘Centres’ and ‘Schools’. Students on joint or combined degree programmes will need to use two departmental handbooks.
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1 Welcome

Welcome to the Department of Geography at Royal Holloway. We very much hope that your year with us will be enjoyable and challenging, and we look forward to working with you on the programme. This handbook aims to give you all the basic information you will require for your academic studies. This includes information on the structure and organisation of the degree programme, teaching arrangements and assessment.

This handbook should be read in conjunction with the Department of Geography Postgraduate Taught Student Handbook, which is available on the departmental website.

1.1 Aims of the programme

The MSc degree in Quaternary Science offers comprehensive and flexible postgraduate training in the established yet dynamic field of Quaternary Science, with the academic emphasis being on the time-dependent processes affecting environmental change. In recent years, Quaternary research has developed a multi- and inter-disciplinary approach to the study of recent Earth history. In addition to the development of new fieldwork and laboratory techniques, substantial advances have been made in geochronological (dating) techniques. These, together with information from new geological archives such as those from the deep ocean floors and in the polar ice sheets, have provided new insights into Quaternary environmental change and created a framework for reconstructing patterns of past change with a degree of accuracy, precision and detail not normally obtainable for older geological periods. Quaternary science therefore provides the best available 'laboratory' for researching Earth-system processes and for generating critical baseline data for predicting future climate change.

The aims of this programme are:

- provide a conversion programme for students of, for example, Biology, Physical Geography, Geology, Ecology, Archaeology, Oceanography, Environmental Science who wish to develop or augment a background in global environmental history and processes;
- provide a training programme for students wishing to continue postgraduate study to PhD standards, and who require fundamental training in appropriate palaeoenvironmental, stratigraphical and/or quantitative principles and methods;
- provide a vocational programme for teachers and professional scientists who desire or require a fuller understanding of the time-dependent elements of environmental change as essential context for their career.

The MSc is taught by members of the Centre for Quaternary Research (CQR) at Royal Holloway, a leading interdisciplinary research centre in the field of Quaternary Science. Expertise within the group covers geochronology, palaeoenvironmental proxies, sedimentology and stratigraphy, tephrachronology and palaeoclimatology amongst others, as well as a range of technical skills such as micromorphology and stable isotope analysis. This range of expertise is augmented by external staff who teach option courses such as Quaternary microfossils, Palynology and Glaciers in the climate system and Palynology. The MSc teaching staff are in a unique position to convey research knowledge, experience and skills that will have direct relevance to employability as well as research training for further education, namely doctoral research.
Past students of the course are now employed by national scientific policy making and implementing agencies such as Natural England, the British Geological Survey and the Environment Agency, within government Research Councils, science publishing, higher education institutions, and as teachers and researchers. Many of our alumni are also currently undertaking doctoral programmes in the UK and abroad.

**Learning outcomes:**
Teaching and learning in the programme are closely informed by the active research of staff. In general terms, the programme provides opportunities for students to develop and demonstrate the following learning outcomes:

**Knowledge and understanding:**
Acquire and demonstrate specialist disciplinary knowledge and understanding of key issues pertaining to Quaternary Science, in particular the core linking themes of:

- a) high-resolution palaeoenvironmental records;
- b) high-precision dating;
- c) multi-proxy approaches to the investigation of past environmental changes.

**Skills and other attributes:**
- ability to assess the causes, scale and rapidity of past climate and environmental fluctuations, encompassing field, laboratory, statistical and computing methods used in the acquisition, interpretation and modelling of proxy climatic and environmental data;
- ability in project formulation and design, sampling strategies and hypothesis testing;
- effective problem-solving and decision-making;*
- critical analysis and synthesis of information;*
- good communication skills;*
- advanced interpersonal skills;*
- quantitative analysis;*
- skills in Information Technology;*
- good time management;*
- effective team work.*

* transferable skills
1.2 The Staff

Head of Department
Professor Katie Willis 161

Departmental Education Support Officer
Dr Mike Dolton 173

MSc Teaching Staff
Dr Simon Armitage 174a
Professor Simon Blockley 155
Professor Ian Candy 157
Dr Daniele Colombaroli 156
Dr Bethan Davies 148
Professor John Lowe EMU11
Dr Ian Matthews 124
Dr Alice Milner 175
Dr Adrian Palmer 125
Professor Danielle Schreve (CQR Director) 174b
Dr Varyl Thorndycraft 152b

Technical Operations Manager
Dr Claire Mayers 130

Technical/Operations Staff
Ray Aung (Computer Technician) 137
Jenny Kynaston (Cartographic Technician) 137
Adrian Palmer (Senior Research Officer) 125
Katie Flowers (Laboratory Technician) 127
Marta Perez (Laboratory Technician) 127
Iñaki Valcarcel (Laboratory Technician) MF 001

Administrative/Secretarial Staff
Moya Watson (Department Manager) 160
Liz Hamilton (PG Administrator) (Mon-Tue) 162
Karen Oliver (PG Administrator) (Wed-Fri) 162
Laura Flitney (UG Administrator) 162

There are also a number of research staff based in the department and visiting academics. You can find out more about teaching staff and their research interests and activities on the Departmental web pages and in Section 3.
## 2 Course Structure and content

Attendance at all core elements/modules is compulsory. Candidates must complete all of the following course components. Students must complete 180 credits to be awarded the MSc in Quaternary Science.

<table>
<thead>
<tr>
<th>Component</th>
<th>Total Credits</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Five Core Courses</td>
<td>50</td>
<td>Autumn term</td>
</tr>
<tr>
<td>Five Option Courses</td>
<td>50</td>
<td>Spring term</td>
</tr>
<tr>
<td>Glen Roy Field Training Programme</td>
<td>20</td>
<td>Easter break</td>
</tr>
<tr>
<td>Dissertation</td>
<td>60</td>
<td>Summer term and summer holiday</td>
</tr>
</tbody>
</table>

### 2.1 Core Courses
- GG5291 Quaternary Palaeoclimatology (10 credits)
- GG5201 Sedimentology & Stratigraphy (10 credits)
- GG5293 Techniques of Quaternary Research (10 credits)
- GG5232 Palaeoecology, Dating & Quantification (10 credits)
- GG5234 Oral report (10 credits)

Full details of the teaching staff, aims, content, teaching format, assessment, learning outcomes, and assessment goals of these compulsory core courses are provided in Section 4.

### 2.2 Field Training Programme (FTP)
All students are required to participate in the two main residential programmes that are elements of the GG5201 Sedimentology and Stratigraphy core course (4 days in total) and GG5295 (the main Field Training programme, of minimum 10 days). In addition, field training exercises form compulsory elements of some of the option courses. The objectives of these exercises vary and include:

I. collection and analysis of data in the field,
II. collection of materials for laboratory analysis,
III. application of advanced analytical skills, applying the principles of the methods taught in the relevant option course,
IV. in-depth study of Quaternary palaeoenvironmental and/or stratigraphical evidence.

The Glen Roy Field Training Programme is worth 20 credits of your MSc Degree.

### 2.3 Option Courses
Below is a list of the option courses offered in the Spring Term of 2018, from which students are required to select five. Some degree of flexibility in the curriculum is envisaged in order to make provision for staff sabbaticals and other logistical matters. Each course is worth 10 credits.

- GG5203 Palynology (External lecturer)
- GG5209 Micromorphology
- GG5212 Luminescence Dating
- GG5220 Quaternary Microfossils (Dr Tom Hill, Natural History Museum)
- GG5223 Quaternary Mammals
- GG5233 Glaciers in the Climate System (Dr Richard Jones, Durham University)
- GG5290 Tephrochronology
- GG5235 Palaeofires

Full details of the teaching staff, aims, content, teaching format, assessment, learning outcomes,
and assessment goals of these option courses are provided in Section 6.

Each option course is taught in a block of one week (5 working days). The assessment for option courses may take a variety of forms, including laboratory reports, practical exercises, essays and scientific papers, depending upon the course. However, the assessments are designed in such a way as to be capable of completion within a maximum of two days additional to the 5 days allocated to the course for instruction.

2.4 Dissertation
Candidates must also prepare a dissertation (GG5299) not exceeding 10,000 words. The aim of the dissertation is to build upon the research training provided in the core and option courses and to enable students to undertake an independent and original piece of research on a Quaternary Science topic of their choice. The Dissertation is worth 60 credits of the MSc Degree.

Members of staff may circulate a list of dissertation topics that they wish to supervise, but it is the student's responsibility to identify an appropriate topic and supervisor(s). Having done so, students must produce a written draft dissertation proposal outlining aims, methods and resource requirements. These drafts are circulated to staff attending the presentations in early May at which oral presentations of dissertation projects are made. After taking into account verbal and written comments of staff, students complete and submit a final dissertation proposal that must be approved by supervisors and the Programme Director before field or laboratory work can be undertaken.

All members of the Teaching Team are available to be supervisors and external advisers/co-supervisors may also be appointed where appropriate. Each student is allocated one or more supervisors who will provide guidance on appropriate techniques and approaches as required. It is the supervisor's responsibility to ensure that a student is made aware of the relevant health and safety procedures in the field and/or laboratory. The assessment should be submitted in both paper and electronic format.

Learning outcomes of the dissertation

By the end of the dissertation, students should be able:

- To plan, design and execute an advanced and rigorous piece of Quaternary Science research
- To undertake effective fieldwork/laboratory/desk-based analysis with due regard for safety and risk assessment
- To collect, combine, present, analyse and interpret different types of Quaternary Science data

Assessment goals

The degree to which students have successfully attained these learning outcomes is evaluated:

- Directly through the dissertation

Promotion of transferable skills
The dissertation develops a range of transferable skills including time management, problem solving, presentation, writing and critical analysis.

Formal requirements for the preparation and submission of the dissertation are outlined in Section 7. Section 8 outlines the dissertation marking guidelines and grade descriptors. Section 9 lists a selection of the topics chosen by students registered for the degree programme in recent years; this will give an indication of the wide range of topics and techniques available.

2.5 Courses and coursework deadlines

Dates for courses and deadlines for course assignments are outlined in the table below. All deadlines are at 4 pm. Please follow the coursework submission guidelines in the following section.

| Core courses (Special events in Italics) |
|-------------------------------|----------------|----------------|----------------|
| Date                          | Course                              | Course leader | Submission Deadline | Return of marks |
| 18-22 Sep                     | Induction week                       |               |                  |                |
| 25 Sep-6 Oct                  | GG5291 Quaternary Palaeoclimatology  | IM            | 4 Dec            | 8 Jan          |
| 9-20 Oct                      | GG5201 Quaternary Stratigraphy & Sedimentology | IC | 13 Nov | 11 Dec |
| 23-27 Oct                     | Reading week                         |               |                  |                |
| 23rd Oct                      | Graphics training, 2 – 5 pm          | Jenny Kynaston |                  |                |
| 31 Oct-6 Nov                  | GG5293 Techniques of Quaternary Research I | VT |                  |                |
| 7-10 Nov                      | GG5293 Techniques of Quaternary Research II | BD | 7 Dec | 8 Jan |
| 8th Nov                       | London Quaternary Lectures           |               |                  |                |
| 13-17 Nov                     | GG5232 Palaeoecology, Dating & Quantification I | DS |                |                |
| 20-24 Nov                     | GG5232 Palaeoecology, Dating & Quantification II | SB |                |                |
| 21 Nov                        | Prof. Ian Candy Inaugural Lecture     |               |                  |                |
| 27 Nov-1 Dec                  | Reading week                         |               |                  |                |
| 30th Nov                      | Performing Wild Geographies workshop (10-4 pm) | David Overend; DS | Optional |                |
| 4-8 Dec                       | GG5232 Palaeoecology, Dating & Quantification III | SB | 15 Jan | 12 Feb |

Christmas Vacation (9 December - 7 January)

Option courses

<table>
<thead>
<tr>
<th>Date</th>
<th>Course</th>
<th>Course leader</th>
<th>Submission Deadline</th>
<th>Return of marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-12 Jan</td>
<td>GG5290 Tephrochronology</td>
<td>IM</td>
<td>5 Feb</td>
<td>5 Mar</td>
</tr>
<tr>
<td>15-19 Jan</td>
<td>GG5203 Palynology</td>
<td>TH</td>
<td>12 Feb</td>
<td>12 Mar</td>
</tr>
<tr>
<td>22-26 Jan</td>
<td>Reading week</td>
<td></td>
<td>19 Feb</td>
<td>19 Mar</td>
</tr>
<tr>
<td>29 Jan-2 Feb</td>
<td>GG5223 Mammals</td>
<td>DS</td>
<td>26 Feb</td>
<td>26 Mar</td>
</tr>
<tr>
<td>5-9 Feb</td>
<td>GG5209 Micromorphology</td>
<td>AP</td>
<td>5 March</td>
<td>9 April</td>
</tr>
<tr>
<td>12-16 Feb</td>
<td>GG5235 Palaeofires</td>
<td>DC</td>
<td>12 March</td>
<td>9 April</td>
</tr>
<tr>
<td>19-23 Feb</td>
<td>GG5220 Quaternary Microfossils</td>
<td>TH</td>
<td>9 April</td>
<td>7 May</td>
</tr>
<tr>
<td>26 Feb-2 Mar</td>
<td>GG5212 Luminescence</td>
<td>SA</td>
<td>16 April</td>
<td>14 May</td>
</tr>
<tr>
<td>5-9 Mar</td>
<td>GG5233 Glaciers in the climate system</td>
<td>Richard Jones</td>
<td>23 April</td>
<td>21 May</td>
</tr>
<tr>
<td>12-16 Mar</td>
<td>GG5293 Techniques of Quaternary Research III (compulsory): Glen Roy training</td>
<td>AP</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Summer term

<table>
<thead>
<tr>
<th>Date</th>
<th>Course</th>
<th>Course leader</th>
<th>Submission Deadline</th>
<th>Return of marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>17-28 Mar</td>
<td>GG5230 Residential field training programme, Scottish Highlands</td>
<td>AP</td>
<td>30 April</td>
<td>29 May</td>
</tr>
<tr>
<td></td>
<td>Dissertation proposal form (formative)</td>
<td></td>
<td>3 May</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dissertation proposal oral presentations (formative)</td>
<td></td>
<td>9 May</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GG5299 Dissertation submission</td>
<td></td>
<td>22 Aug</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GG5234 Oral presentation of dissertation results</td>
<td></td>
<td>29 Aug</td>
<td></td>
</tr>
</tbody>
</table>

Please note that the option course timetable is provisional, and one or more courses are likely to change date.

Students must retain copies of assignments as the originals will not be returned; staff will not write comments on the scripts. Feedback is via a pro forma completed by the first marker (with additional comments by the second marker if appropriate). Percentage marks are supplied.

Students will be e-mailed when proformas are ready for collection from the document holder on the Programme Director or Course Leader's door. Numerical marks are only finalised when they have been ratified by the College Board of Examiners. Until that time (October 2018), all marks are provisional.

Section 7 shows the assessment criteria that are used by examiners in marking work within the Department, and shows you the general criteria that are used to calculate grades and marks. They are general models of the characteristics that are expected of work being awarded particular grades.

### 2.6 Submission of coursework

Guidelines for the submission of coursework are provided in the *Department of Geography Postgraduate Taught Student Handbook*, which is available on the departmental website.

It is normally expected that you will word-process all assessed written work, unless a prior agreement has been made with the course leader. All assessed work should be handed in at the Departmental Office/Helpdesk (QB162) in person by 4pm on the specified deadline for each course.

Coursework receipts are issued by the Postgraduate Administrators, and you should retain these until the examination process is completed for the year in the following September. In addition, an electronic copy of the coursework should be submitted to the College plagiarism system, Moodle - Turnitin, by the given deadline. A receipt of submission of work to the Turnitin system should be handed in to the Departmental office when submitting the paper copy of the assessed work the turnitin ID number and candidate number should be clearly typed or handwritten on the first page of your work. In addition you will be asked to supply an electronic copy on a USB stick and the Postgraduate Administrators will take a copy. Both paper and electronic (via Turnitin) copies of assessed work must be submitted prior to the deadline to avoid incurring penalties.

This information is summarized in Table 1 below.
Table 1. Submission of coursework checklist

<table>
<thead>
<tr>
<th>Printed Hardcopy of Written Work</th>
<th>Submit electronically on Moodle – Turnitin Submission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candidate Number on First Page – Can be found on Campus Connect</td>
<td>Turnitin Paper ID number on First Page – Will be on the Turnitin Receipt</td>
</tr>
<tr>
<td>USB Stick with Electronic Copy of Written Work</td>
<td>Hardcover of Turnitin Receipt</td>
</tr>
<tr>
<td>Complete a Coursework Receipt – Available at Office/Helpdesk (QB162)</td>
<td></td>
</tr>
</tbody>
</table>

Specific guidelines on the submission of the Dissertation are provided in Section 7. For more details on submission of coursework, please refer to the Taught Postgraduate Handbook.
3 Teaching staff and administration

MSc Programme Director & Chairman of Sub-Board of Examiners
Responsible for overseeing day-to-day running of degree programme, policy matters, forward planning, recruitment, selection of candidates and liaison with external organisations. The current Director of the MSc in Quaternary Science is Dr Bethan Davies.

MSc Teaching Team
All members of staff contributing to the teaching of the course syllabus (see details below).

MSc Examination Sub-Board
All members of staff contributing to the teaching of the course syllabus and one Visiting Examiner of senior status within the field of Quaternary Science. The current Visiting Examiner is Professor Pete Langdon, Professor of Palaeoenvironmental Change, University of Southampton.

3.1 Brief Staff curricula vitae

Dr Simon Armitage
Reader in Quaternary Science, Centre for Quaternary Research, Department of Geography, RHUL

Simon is the Director of the Geochronology Laboratory at Royal Holloway and has research interests in the technical and theoretical development of luminescence dating and its application to a wide range of Quaternary archaeological and palaeoenvironmental problems. He is particularly interested in climate change and archaeology in dryland environments, with current work focusing on the impacts of late Quaternary climatic changes upon pre-industrial human/hominin populations in Africa and the Arabian Peninsula.

Professor Simon Blockley
Professor of Quaternary Science, Centre for Quaternary Research, Department of Geography, RHUL

Simon’s research activity focuses on improving chronologies, by better age modeling and through tephrochronology. He is a Co-Investigator on the NERC RESET (Response of Humans to Abrupt Environmental Transitions) consortium, leading efforts to trace and identify tephra layers in terrestrial sites in Europe and North Africa, and leads the Chronology workgroup of the EU-funded INTegrating Ice core, MArine and TErrestrial records (INTIMATE) project, which aims to develop common protocols and methods to reconstruct abrupt and extreme climate change across Europe, 60,000 to 8000 years ago. Much of his research has been focused on the Lateglacial, including ongoing work at the classic late upper Palaeolithic/Mesolithic site of Star Carr (North Yorkshire).
Professor Ian Candy

Professor of Geography, Centre for Quaternary Research, Department of Geography, RHUL

Ian’s research interests include the study of Quaternary sedimentary sequences from Britain through the Mediterranean and Near East with the aim of producing high resolution chronologies that allow better understanding of geomorphic response to environmental change. In particular Ian is keen on combining U-series dating with other complementary techniques (such as OSL) to produce high precision sediment chronologies that can be correlated with high resolution records of palaeoclimatic change.

Dr Daniele Colombaroli

Lecturer in Quaternary Science, Centre for Quaternary Research, Department of Geography, RHUL

Daniele is biosphere paleoecologist studying the role of disturbances (human impact, fire, extreme events) on ecosystem structure and functions (biodiversity). He is interested in key biogeographical areas for future global changes (including Equatorial Africa, the Mediterranean Basin, and mountain regions in Europe and North America), and covering temporal scales from annual tree rings to the millennial scale of climate variability. The specific proxy data that he uses are pollen, charcoal, sedimentological properties and stable isotopes from high-resolution paleoecological records. Daniele’s research projects have examined Fire in the Anthropocene, climate-vegetation disequilibria, the origin of “iconic” cultural landscapes, quantitative fire reconstructions, and are oriented towards the applications of long-term ecological records in biodiversity conservation and forest management.

Dr Bethan Davies

Lecturer, Centre for Quaternary Research, Department of Geography, RHUL

Bethan is a glacial geologist interested in the interaction between glaciers and climate over multiple timescales. She specialises in ice-sheet and glacier reconstruction in temperate and high latitudes. Bethan uses a combination of field studies, chronostratigraphical methods (especially cosmogenic nuclide dating), remotely sensed data sets and numerical modelling to quantify ice-sheet and ice-shelf history. She is particularly interested in glacial processes at the ice-bed interface, and has used detailed sedimentological analyses and micromorphology to analyse processes of entrainment, deposition and deformation. Her current research interests are orientated towards the Antarctic Peninsula, the Patagonian Ice Sheet and the last British-Irish Ice Sheet. She is an editor of the Royal Society Open Science and the Open Quaternary journals.

Dr Tom Hill (external, Natural History Museum)

Head of Economic and Environmental Earth Sciences Division and Micropalaeontology Sector Leader, Natural history Museum, London

Tom’s main research interests lie in the reconstruction of Quaternary palaeoenvironments. He has specific expertise in late Quaternary climate change, with focus on the transition from the Devensian Late-glacial to the Holocene period, and has experience in the application of pollen,
diatom and particle size analyses to palaeoenvironmental reconstructions.

Tom also has interests in contemporary and ancient coastal lowland systems and the use of microfossils, including diatoms and foraminifera preserved in coastal sedimentary archives as a quantitative tool for reconstructing sea-level change during the Holocene. His most recent work builds on a strong interest in geoarchaeology and the use of palynology and stratigraphy to study the impact of human activity on the landscape change during the prehistoric period.

Dr Richard S Jones

Junior Research Fellow, Department of Geography, Durham University

Richard is glacial geologist interested in the behaviour of glaciers on centennial to millennial timescales. His research focuses on reconstructing past ice geometries and dynamics at high latitudes. He primarily uses cosmogenic nuclide dating to determine the extent of glaciers at difference times in the past, and glacier modelling to better understand the response of glaciers to climate and topography-induced perturbations.

Much of Richard's research is concentrated in Antarctica, particularly looking at East Antarctic outlet glaciers over the Pliocene and Pleistocene, and during the Holocene. Richard’s other interests include determining the contribution of Antarctic ice sheets to past sea level change and developing the applications of cosmogenic nuclides to better reconstruct ice sheet history.

Professor J. John Lowe

Professor of Geography and Quaternary Science, Centre for Quaternary Research, Department of Geography, RHUL

John’s research interests include Quaternary palynology, high-precision geochronology of late Quaternary events, Late Quaternary palaeoclimate change, tephrostratigraphy, palaeolimnology and peat stratigraphy. He was Lead PI on the NERC RESET consortium and a founding member of the EU-funded INTEGRATING Ice core, MArine and TErrestrial records (INTIMATE) project. He is a Past President of the Quaternary Research Association and of the INQUA Palaeoclimate Commission.

Dr Ian Matthews

Senior Lecturer, Centre for Quaternary Research, Department of Geography, RHUL

Ian’s research combines aspects of geochronology, environmental archaeology and palaeoecology. Most recently, he has focused on constraining and testing Holocene human-environment interactions in European wetlands through high-precision geochronological techniques including tephrochronology. His interests currently extend into investigating abrupt climate change in a variety of geographic regions, including the North Atlantic seaboard and the central Mediterranean, through the generation of robust palaeoenvironmental and archaeological datasets underpinned by precise and accurate chronologies. He is a member of the EU-funded INTEGRATING Ice core, MArine and TErrestrial records (INTIMATE) project.
Dr Alice Milner

Lecturer, Centre for Quaternary Research, Department of Geography, RHUL

Alice’s research is focused on using high-resolution pollen and multiproxy records to characterise ecosystem and climate change during the interglacials and early glacial of the late Quaternary (Eemian and Holocene). She is particularly interested in using pollen analysis to understand rapid climate changes and their characteristics, causes and effects on terrestrial ecosystems. Much of Alice’s research has focussed on wetland, lake and marine sites in the Mediterranean and the UK, although she also has interests in using pollen to support archaeological interpretations of early human activity in East Africa. Some of her current research applies a contemporary and palaeo approach to understand recent ecological and hydrological changes in peatlands, with an overarching aim of improving the robustness of peat-based environment and climate reconstructions.

Dr Adrian Palmer

Senior Research Officer in Physical Geography, Centre for Quaternary Research, Department of Geography, RHUL

Adrian is the deputy Technical Operations Manager in the Department of Geography. His research involves the development of high-resolution chronologies for the UK using the thin section micromorphology technique for the analysis of annually laminated sediments. Adrian has particular interests in the Lateglacial of the Scottish Highlands but also works on Middle Pleistocene glacial and interglacial deposits, including the generation of high-resolution information for the Hoxnian parastratotype deep lake sequence at Marks Tey in Essex. He is also a member of the EU-funded INTegrating Ice core, MArine and TErrestrial records (INTIMATE) project, which aims to develop common protocols and methods to reconstruct abrupt and extreme climate change across Europe, 60,000 to 8000 years ago.

Professor Danielle Schreve

Professor of Quaternary Science, Centre for Quaternary Research, Department of Geography, RHUL

Danielle’s research is on Quaternary mammals, combining biostratigraphy and the reconstruction of past environments, with the investigation of palaeobiological aspects such as extinctions and evolutionary change and the interaction of past mammalian communities with early humans. She has worked extensively on fluvial sequences in the UK (especially the Thames and Trent), on tufa sites in central Europe and most recently, on Late Pleistocene cave sites in Britain. She is a core member of the Ancient Human Occupation of Britain project (a £3.3 million research project funded by the Leverhulme Trust), past President of the Geologists’ Association, Fellow of the Society of Antiquaries and current Vice President of the Quaternary Research Association. She is also a member of the EU-funded INTegrating Ice core, MArine and TErrestrial records (INTIMATE) project.
Dr Varyl Thorndycraft

Senior Lecturer, Centre for Quaternary Research, Department of Geography, RHUL

Varyl is a fluvial geomorphologist with research interests in palaeohydrology and investigating the response of rivers to changing climate and land use drivers during the Holocene. His research areas currently encompass the north-west of England and southern Chile. His work combines alluvial stratigraphic and hydraulic flood modelling approaches to quantify flood response to past environmental change, by reconstructing pre-instrumentation flood magnitudes and frequencies from slackwater flood deposits preserved in bedrock gorges, and by quantifying the response of flood hydraulics to both autogenic and allogenic drivers. He is a Member of the Executive Committee of the British Society for Geomorphology and Vice-Chair of the Publications sub-Committee.
4 Core course outlines

4.1 GG5291 Quaternary Palaeoclimatology

Staff
Dr Ian Matthews (co-ordinator), CQR staff

Aims
The course aims to provide a comprehensive introduction to the different palaeoclimate archives and proxies. It will provide an overview of Quaternary climate forcing factors (both internal and external), events, cycles and thresholds, illustrated with a range of case studies.

Content

Week 1: The Quaternary Period and Climate Change

Overview of the structure of the Quaternary, characteristics, key terms; Onset of global cooling, potential causes for the onset of the Quaternary; Ice Age cycles, ideas of Orbital Forcing, the proxy record of Ice Age cycles in the benthic $^{18}$O record; The proxy record of Ice Age cycles in the ice core record; amplification of the orbital signal (albedo, dust and greenhouse gases); Abrupt climate change during the last Glacial; Heinrich events, D/O cycles and the Bi-Polar see-saw; proxy records of abrupt change and their correlation; Abrupt and short-term climate change during the Holocene; key events and their causes (8.2ka, Medieval Warm Period, Little Ice Age); response of ecosystems and landscapes.

Week 2: Quaternary climate change: its Physical Expression

Quaternary climate change in High latitudes; Quaternary Glaciations; Quaternary climate change in the temperate Mid-Latitudes (western Europe and the Mediterranean); Abrupt climate change in northwest Europe

Teaching format
The course is based upon lectures and class discussion.

Assessment
Coursework accounts for 100% of the marks: 3000 word essay in the style of a NERC-quality grant proposal, on a choice of palaeoclimatological topics.
Learning outcomes

By the end of this course, students should:

- Understand the nature and process of climate forcing factors during the Quaternary, including external (e.g. tectonics, orbital forcing, solar) and internal (e.g. ocean circulation, ice sheets, greenhouse gases) factors.
- Appreciate the archives available to provide Quaternary palaeoclimate records, particularly ocean and ice cores.
- Have an overview of Quaternary climate thresholds, cycles and events (e.g. onset of Northern Hemisphere glaciation, Mid-Pleistocene Revolution, Glacial-Interglacial cycles, Dansgaard-Oeschger cycles, Heinrich events, ENSO, NAO).
- Understand the physical expression of Quaternary palaeoclimate through a range of case studies.

Assessment goals

The degree to which students have successfully attained these learning outcomes is evaluated:

- Directly through the course work essay
- Indirectly through the dissertations which may benefit from an appreciation of the specific techniques and palaeoclimatic principles covered in the course.

Promotion of transferable skills

Group discussion promotes evaluation and critique of published information. The course work encourages the assimilation, summary and interpretation of palaeoclimatic datasets, requiring considerable organisation and presentation skills. The style of a NERC grant proposal for the assignment promotes skills in designing and costing a research grant.

4.2 GG5201 Sedimentology and Stratigraphy

Staff

Professor Ian Candy & other CQR staff

Aims

The aim of the course is to make students aware of how Quaternary sequences are preserved and explain how sediments accumulate in a range of depositional environments (including fluvial, marine, glacial, lacustrine and aeolian), highlighting the problems that different depositional environments present for the construction of continuous Quaternary records. The course also aims to highlight the issues associated with constructing stratigraphies within the fragmented terrestrial record and the problems of relating these stratigraphies to climatic events in the continuous marine isotopic record, and to explain the range of approaches that can be used to construct stratigraphies, with particular reference to the Quaternary stratigraphy of Britain. Finally, the course will develop student ability to describe and interpret sediment sequences using a range of techniques.
Content

Week 1: Sedimentology

Introduction; Depositional processes and flow; Diamicton processes; Sorted sediment structures; Deformation structures; Particle size analysis; Sediment fabrics; Roundedness and other properties; Describing sediments in the field; Field sedimentology: poorly sorted sediments (Hunt’s Bay, South Wales); analysis of Quaternary sediments (practical) and presentation of field and laboratory results in the afternoon; Lacustrine sedimentation; sediment accumulation and preservation; Review of fieldwork data

Week 2: Stratigraphy

Quaternary climate change; Terrestrial stratigraphies and introduction; Stratigraphic techniques; the Early and early Middle Pleistocene in the UK; Warm climates in the early Middle Pleistocene; Lowland Glaciation; Interglacial episodes; Quaternary stratigraphy in the field (two day trip to eastern England); Last Glacial cycle and the Last Glacial Maximum; the Lateglacial/Interglacial transition; Review of fieldwork results

Teaching format

The course is based upon lectures, field trips, practicals and class discussion.

Assessment

Coursework accounts for 100% of the marks on the course. There are two coursework reports, based around the field trips (one based on sedimentology and one based on stratigraphy), both of these will be a maximum of 1500 words.

Learning outcomes

By the end of this course, students should:

- Understand the processes that lead to the accumulation of sediment sequences
- Identify the strengths and limitations of sediment sequences as archives of palaeoenvironmental change
- Develop skills in recording sediment characteristics and attributes in the field
- Be able to explain the main techniques that are commonly used to construct terrestrial stratigraphies
- Develop key skills in presenting and describing scientific data

Assessment goals

The degree to which students have successfully attained these learning outcomes is evaluated:

- Directly through the course work essays
- Indirectly through the dissertations which may benefit from an appreciation of the specific techniques and sedimentological/stratigraphical principles covered in the course
Promotion of transferable skills

Group discussion promotes evaluation and critique of published information. The fieldwork encourages observational and descriptive skills. The course work encourages the assimilation, summary and interpretation of sedimentological and stratigraphical datasets, requiring considerable organisation and presentation skills, in particular of stratigraphical logs.

4.3 GG5232 Palaeoecology, Dating and Quantification

Staff

Professor Danielle Schreve (co-ordinator Week 1), Professor Simon Blockley (co-ordinator Weeks 2 and 3), CQR Staff

Aims

The aims of the course are to provide an overview of important palaeoecological proxy methods used to reconstruct Quaternary environments and biotic assemblages and to provide instruction of methods employed to obtain quantitative estimates of past environmental conditions using palaeoecological data. Students will be introduced to the principal methods used to date Quaternary sequences, and learn to assess their limitations, and will then combine palaeoecological methods with chronological data in order to construct realistic age models from which the timing, rate and persistence of environmental changes can be inferred. The overarching aim is this to show how the above procedures and their outcomes fit into the wider perspective of global models of past environmental change and the potential for testing models of future environmental change.

Content

Week 1: Palaeoecology

Uniformitarianism; taphonomy; application, strengths and limitations of a range of environmental proxies, such as pollen, plant macrofossils, beetles, chironomids, cladocerans, vertebrates and hominins, diatoms, marine foraminifera, ostracods, molluscs and biomarkers

Week 2: Quaternary geochronology

The application, strengths and limitations of a range of Quaternary dating methods, including the construction of the SPECMAP timescale based on oxygen isotope variations, radiometric methods (potassium-argon; U-series; radiocarbon), radiation ‘damage’ methods (luminescence, fission track, and cosmogenic isotope ratio analysis), chemical and biological degradation methods (obsidian hydration, uranium uptake and calcification, amino-acid dating), time-equivalent procedures (palaeomagnetic variations, volcanic ash chronology) and annually-resolved methods (dendro-chronology, varve chronology, coral growth layers).

Week 3: Quantification and modelling
Radiocarbon calibration procedures; age model construction and testing; convergence testing of age models; modern analogue approach to modelling of past environmental conditions; transfer function approaches; spectral analysis; time-space reconstructions/mapping; biome models and Earth System Models.

Teaching format

The course is based upon lectures, practical exercises and class discussion.

Assessment

Coursework accounts for 100% of the marks on the course: a 3000 word course paper (on a choice of topic), reporting results of analysis of a palaeoecological data-set.

Learning outcomes

By the end of this course, students should:

- Have an up-to-date overview of key methods used in Quaternary palaeoecology and chronology
- Have experience of how these approaches are combined to generate integrated models of environmental change
- Be able to judge which methods have the highest potential and reliability in different geographical, stratigraphical and site contexts
- Have knowledge of running quantitative models, including Bayesian-based procedures, from which the magnitude and rate of environmental change can be inferred, and to assess the uncertainties associated with the results
- Be better equipped to design experiments that may lead to improved precision and accuracy of environmental reconstruction and geochronological definition. Understand the physical expression of Quaternary palaeoclimate through a range of case studies

Assessment goals

The degree to which students have successfully attained these learning outcomes is evaluated:

- Directly through the course work essay
- Indirectly through the dissertations which may benefit from an appreciation of the specific techniques and palaeoecological and geochronological principles covered in the course

Promotion of transferable skills

Group discussion promotes evaluation and critique of published information. The laboratory work encourages observational and descriptive skills. The course work encourages the assimilation, summary and interpretation of palaeoecological and geochronological datasets, requiring considerable organisation and presentation skills.
4.4 GG5293 Techniques of Quaternary Research

Staff

CQR teaching staff

Aims

The course aims to provide a range of specific and transferrable skills in laboratory, field and desktop techniques to: a) complement skills taught on other core and option courses; b) prepare the students for their dissertation; and c) improve employability.

Content

The course is divided into three parts, each of a week’s duration:

Week 1: Introduction to Quaternary geomorphology; importance and applications of mapping and surveying in Quaternary Science; remote sensing; aerial photographs; Google Earth; NextMap and other methods; practical sessions on use of Google Earth using case studies; field surveying (Total Station, differential GPS, coring, sediment description); introduction and practical sessions on LiDAR and GIS; graphics training (drawing of sediment logs). The graphics training session will be taught separately as a single session in Reading Week so as to provide maximum benefit following the Sedimentology & Stratigraphy core course.

Week 2: Oral presentations; PhD and grant applications advice; webpage design training and practice, employability session with former graduates and other employers

Week 3: Preparation for the Scottish Highlands field course, including approaches to mapping and interpreting glacial landforms; key elements of the glaciation history of the Highlands.

Teaching format

The course is based upon fieldwork, laboratory and computer practicals, oral presentations and lectures.

Assessment

Students will be given verbal and written feedback on: a) their mapping skills (Week 1); oral presentations (Week 2); and web design (Week 3).

Coursework accounts for 100% of the marks on the course: A website conveying the findings and significance of a scientific paper to a general audience. Attendance on the course is a compulsory pre-requisite for the students to attend the Scottish field trip (GG5230) and undertake the dissertation (GG5299).

Learning outcomes

By the end of the course, students should:
- Be familiar with essential field techniques including remote sensing, surveying, mapping, coring and other methods
- Be able to integrate field data and LiDAR with GIS to generate and interpret landform models
- Be proficient in presentational skills, both orally and in the form of web-page design; be proficient in the use of graphics for Quaternary sediment logs and other purposes
- Be prepared for the fieldtrip in the Scottish Highlands by understanding approaches to mapping and interpreting landforms and sediments in the field and acquire background in the history of glaciations in Scotland; receive logistical, safety and academic briefings and guidance
- Be able to maximise employment or further research potential through acquisition of specific and transferrable skills

Assessment goals

The degree to which students have successfully attained these learning outcomes is evaluated:

- Directly through a series of field and practical exercises on the fieldtrip and elsewhere
- Directly through the assessed presentations
- Indirectly through the choice, design, content and execution of the dissertation/research project

Promotion of transferable skills

The course provides experience and skills in relevant information-based technology. Teamwork skills are developed through group co-operation for data synthesis and analysis. Skills in graphics and web-page design also form an integral part of this course. Over the course of the programme, each student has to present a minimum of three oral presentations to peers, other postgraduates and academic staff, under conference-type formal proceedings, which fosters communication skills.

4.5 GG5234 Oral report

The last day of the MSc Quaternary Science consists of an academic conference, where MSc students give conference style oral presentations on the topic of their dissertation. The presentation lasts for 10 minutes, and is followed by 5 minutes of questions. The overall performance of each student is assessed by a minimum of five members of the MSc Quaternary Science teaching staff, with a mean mark being calculated. The audience for the presentation consists of all members of the Centre for Quaternary Research (MSc, PhD, technicians and teaching staff), all of whom may ask questions. This conference is the finale of the MSc Quaternary Science.

This conference will be the week following submission of the dissertation. Oral presentations should be 10 minutes long and should allow 5 minutes for questions. Timings will be strictly observed. This oral presentation is worth 10 credits of your MSc Degree.
GG5230 Field Training Programme

Staff

Dr Adrian Palmer, Dr Ian Matthews and Professor John Lowe

Aims

This field course (currently based in the Western Highlands of Scotland) aims to provide students with a sustained period in the field to gain in-depth experience of a range of field methods, including landform mapping, instrumental surveying, sub-surface coring, stratigraphic logging and applied numerical modeling. It also has been designed to bring together all of the relevant elements and approaches that the students have studied in the Core and Option courses. During the field course, these different threads are all brought to bear on a particular time period and landscape context, and a core theme. The theme is the extent, timing, rate and causes of the growth and demise of the last glaciers to occupy the Western Highlands of Scotland. It is scheduled just before the date when students are required to select project topics for the dissertation element of the degree programme, and therefore provides instruction relevant to project design, execution and presentation. It therefore provides a bridge between the taught courses in Terms 1 and 2, and the Dissertation (individual project) of Term 3.

Content

Two preparatory days of lectures are provided in advance of departure to Scotland, to set the regional and scientific context, explain the structure, aims and content of the course, and introduce the students to the literature available. The field course itself is structured as follows:

The first six days of the course introduce the students to the local landscape and key geological features, to existing theory and understanding, and to the outstanding questions that remain to be answered, particularly concerning the extent, timing and causes of the last glacier ice masses to have occupied the Scottish Highlands. The party visits different locations throughout the Highlands, the students are shown important elements of the field evidence, and are required to keep notes of their observations and of the field discussions. In the evenings, staff lead discussions on the evidence covered each day, invite questions, and provide a steer towards current gaps in knowledge. Data projectors are available for this purpose.

Day 7: The students are then given a full day to review the information gathered during the first six days, and to design their own team projects that address some of the key issues raised in earlier discussions. The project proposals are reviewed by the staff on the evening of Day 7, and equipment lists and other logistical requirements are agreed with each project team.

Days 8 and 9 are devoted to execution of the team projects, with the results and observations reviewed each evening. Students are encouraged to photograph the features they observe, the field methods employed, and any particularly problematic elements encountered, and in the evenings these can be shown to peers and staff, allowing the emerging evidence and project progress to be reviewed.

Day 10 is student-led. In the morning each team co-ordinates their project results and prepares a PowerPoint presentation explaining the project’s aims, methods, results and scientific
implications. In the afternoon, a mock-conference session is held, during which each team presents their project results within predetermined time limits. Each presentation is followed by questions and discussion.

Please note that in any given year, practical considerations may require a modification of the timetable outlined above.

Assessment

(a) A summative 2500 word Field Project Report, explaining the aims, methods, results and outcomes of the field project completed, with a 500-word appendix explaining the individual student’s contribution to the project (70% of marks).

b) An A3 colour poster to be presented at a mock conference session entitled ‘The Late Quaternary of Scotland: Current Issues and future perspectives’. The students would be asked to identify a key scientific problem within one of the topics discussed during the field training programme, explain our current understanding and then summarise a future programme of research that might advance our understanding of the Late Quaternary Geology of Scotland (30% of marks).

Learning outcomes

By the end of the course, students should be able to:

- Plan and conduct field-based investigations that address key, modern research questions in Quaternary Science.
- Develop the optimal design strategies for field-based experiments, including the development of substantive aims and objectives for a project.
- Work as a team for the integration of linked field investigations and data synthesis
- Visualize field-based experimental results and evaluate their significance
- Present research results in poster form

The course also provides students with hands-on experience of a range of field equipment and illustrates the full gamut of progressive stages in field-based research, from conceptualising a problem, through experimental design, to delivery of results. The students will also have a much clearer idea of how the various topics taught in the Core and Option courses can be integrated for the reconstruction of relatively sophisticated palaeoenvironmental models.

Assessment goals

The degree to which students have successfully attained these learning outcomes is evaluated:

- Directly through the field report and poster
- Directly through a series of field and practical exercises on the fieldtrip
- Directly through the mock presentations
- Indirectly through the choice, design, content and execution of the dissertation/research project
Promotion of transferable skills

The course provides experience and skills in participating in field research and planning of field-based analyses. Fieldwork encourages individual observational and descriptive skills. Teamwork skills are developed through group co-operation for data synthesis and analysis. Students also present talks and posters under conference-type formal proceedings, which fosters communication skills and promotes abilities in synthesizing information.
6 Option course outlines

6.1 GG5203 Palynology

Course Leader

Dr Tom Hill (NHM)

Aims

The course aims to provide a thorough grounding in the theory and methodology of Quaternary pollen analysis, in particular pollen morphology, pollen identification, pollen recruitment and preservation, field and laboratory techniques, pollen counting, construction and zonation of pollen diagrams, and interpretation of pollen diagrams in terms of past flora, vegetation, landscape and environment. Particular emphasis is given to the “hands on” aspects of pollen analysis.

Content

The detailed syllabus covers the following topics:

- Basic pollen structure, pollen types and pollen identification
- Field sampling selection criteria
- Preparation and laboratory techniques
- Pollen counting and pollen diagram construction
- Zonation and use of computer programs to plot a pollen diagram
- Interpretation of pollen analytical data
- Factors affecting fossil pollen abundance, diversity and preservation

Teaching format

The course is based upon lectures, laboratory practical and data analysis classes.

Assessment

Course assessment is based on a 3000 word report, formatted as a short communication that conforms to the guidelines of a specified Quaternary journal. The report should include (i) the results of laboratory analytical exercises undertaken during the course; (ii) data plots and a zoned pollen diagram, with justification for the zonation scheme; and (iii) critical assessment of the data in the context of relevant published late Quaternary pollen records.

Learning outcomes

By the end of this course, students should:

- Understand the principles of pollen analysis as a tool in Quaternary palaeoecology
- Be aware of the strengths and the weaknesses of pollen analysis as a tool in Quaternary research
- Know how to make reliable pollen counts of samples and plot a pollen diagram
• Appreciate the factors which influence the assessment and interpretation of Quaternary pollen-analytical data

Assessment goals

The degree to which students have successfully attained these learning outcomes is evaluated:

• Directly through the formally assessed work, in which the students must show an understanding of the theory and practice of Quaternary pollen analysis and the ability to perform reliable pollen counts
• Indirectly through the dissertation, which may benefit from an appreciation of the specific techniques and palaeoecological principles, as well as the general concepts covered in the course

Promotion of transferable skills

The course encourages clear and logical thought in the design and implementation of Quaternary pollen-analytical studies and in the analysis and interpretation of Quaternary pollen stratigraphical data. The course involves individual practical work, which encourages observational skills. The assessment requires critical reading and assimilation of original papers, and the ability to synthesise and evaluate critically selected scientific publications.

6.2 GG5209 Micromorphology

Course Leader

Dr Adrian Palmer

Aims

The course will provide an introduction to the study of thin section micromorphology and its application to Quaternary sediments. The course will focus on the preparation of thin sections from unconsolidated sediments, using appropriate descriptive formats and generate robust interpretations of different Quaternary sediment sequences. Students should also have an understanding of how thin section micromorphology has become a key tool in Quaternary Sedimentology and is of crucial importance for the interpretation and palaeoenvironmental reconstruction of Quaternary sequences, whilst also essential for the generation of high-resolution chronologies.

Content

The emphasis of the course will be placed on developing the microscopy skills of the students and therefore much time will be devoted to microscopic work. During the examination of sediments time will be set aside for students to describe their findings to the group and discuss the processes of sediment deposition. The syllabus will cover:

• Examples of palaeoenvironmental reconstructions using micromorphology; Sampling techniques in the field and from cores; Preparation of samples in laboratories at RHUL; Introduction to petrological microscopy
- Glaciolacustrine sediments; Introduction to micromorphology of glacigenic sediments
- Glacigenic sediments
- Quaternary palaeopedology

**Teaching format**

The course is based upon lectures, practicals and class discussion.

**Assessment**

An essay (2000 words maximum) focusing on a critical examination of how thin section micromorphology has enhanced Quaternary research. Practical exercises focusing on the detailed analysis of one thin section selected from the suite of palaeoenvironments studied during the course. Thin sections will be made available in the two weeks subsequent to the course in order to develop more detailed descriptions of the sediments (1000 words).

**Learning outcomes**

By the end of this course, students should be able to:

- Understand how sections are sampled in the field and laboratory, including manufacture of thin sections, timescales for the preparation of the slides and costs associated with production
- Use of petrological microscopes for the description of Quaternary sediments
- Use appropriate descriptive techniques and generating summary sheets for communicating the findings of microscale analysis of the different Quaternary sediments covered in the course
- Make appropriate process-based interpretations of thin sections to develop a palaeoenvironmental reconstruction
- Critically examine the micromorphological technique in a variety of sedimentological contexts

**Assessment goals**

The degree to which students have successfully attained these learning outcomes is evaluated:

- Directly through a series of practical exercises requiring the description and interpretation of the microscopic characteristics of different deposits
- Directly through the formally-assessed course work, for which students have to complete exercises designed to test their ability to derive and interpret micromorphological data
- Indirectly through the formulation and execution of dissertations which may benefit from an appreciation of micromorphological studies

**Promotion of transferable skills**

Part of the assessed course work has to be submitted in the form of laboratory reports requiring manipulation of microscopic methods and computer software.
6.3 GG5212 Theory and Applications of Luminescence Dating

Course Leader
Dr Simon Armitage

Aims
The course aims to introduce students to both theoretical and practical aspects of the luminescence dating of Quaternary sediments.

Content
The detailed syllabus includes the following topics:

- Physical mechanisms of luminescence dating
- Preparation techniques and measurement equipment
- Assessment of equivalent dose and environmental dose rate values
- Case studies of luminescence dating in a range of sedimentary contexts

Teaching format
The course is based upon lectures, practicals and class discussion.

Assessment
The course assessment consists of two elements:

1) Course Paper: A 2000 word review of an aspect of luminescence dating including technical information and details of the practical implications. This review should be written in the style of a scientific paper. 67% of course mark.

2) Laboratory report: A concise report (1000 words) on the activities conducted during the practical element of the course. 33% of course mark.

Learning outcomes
By the end of the course, students should:

- Be aware of the processes of luminescence signal accumulation, storage and stimulation
- Be aware of methodologies used to isolate and measure the luminescence signal of those minerals commonly used in luminescence dating
- Be aware of the principles, forms and reliability of environmental dose rate evaluation
- Be able to produce equivalent dose and environmental dose rate values, with associated values of statistical uncertainty, and hence luminescence age estimates

Assessment goals
The degree to which students have successfully attained these learning outcomes is evaluated:
• Directly through a series of practical exercises in the luminescence laboratory
• Directly through the formally-assessed course work, which tests their ability to assess technical information and interpret luminescence data
• Indirectly through the formulation and execution of dissertations which may benefit from an appreciation of OSL

Promotion of transferable skills

The course paper requires critical reading and the assimilation of a wide range of data. The ability to reduce this information to a specified word limit and communicate concisely is developed. The course paper should be in the style of a scientific paper, developing or affirming the knowledge of the technical requirements of such a publication. The laboratory report requires numerical and statistical skills, notably organisation and analysis of large volumes of data within a spreadsheet and practical approaches to error propagation.

6.4 GG5220 Quaternary Microfossils

Course leaders

Dr Tom Hill (NHM)

Aims

The course will provide students with an overview of the role of microfossil analysis in Quaternary science, after which three key microfossil groups (diatoms, foraminifera and testate amoebae) will be studied in detail. These groups will be used to exemplify the advantages and disadvantages inherent in the use of microfossils in Quaternary environmental reconstruction.

Content

The microfossils reviewed are valuable Quaternary 'proxies', providing an indirect signal of past climatic or environmental conditions. Such signals may be linked to changes in temperature, precipitation, sea level etc., which in turn enable Quaternary scientists to establish qualitative and quantitative reconstructions of past environments. Each group will be studied in terms of morphology, identification and environmental interpretation, providing students with the ability to successfully undertake self-directed critical analysis of microfossil data. The microfossil groups under consideration will be divided between freshwater and marine environments.

Teaching format

The course will be divided approximately equally between lectures/discussions and practical work.

Assessment

The course assessment will take the form of a 3,000 word assignment, formatted in the style of a commercial report. Students will be expected to analyse and interpret up to three different microfossil assemblages alongside appropriate metadata (e.g. grain size, sediment colour and texture) and combine these data to provide a palaeoenvironmental interpretation of the sedimentary sequence.
Learning outcomes

By the end of this course, in which practical exercises and assessed coursework form an integral part, students should:

- Appreciate basic taxonomy and identification techniques associated with a selection of microfossil groups.
- Be aware of the key strengths and weaknesses relating to the different microfossil groups when undertaking Quaternary investigations.
- Be competent in the methods used to collect, present and interpret data from a range of microfossil groups.
- Understand and apply the principles of microfossil analyses to Quaternary environmental reconstructions.

Assessment goals

The degree to which students have successfully attained these learning outcomes is evaluated:

- Directly through the formally-assessed course work consisting of a 3000 word report
- Directly through a set of non-assessed practical
- Indirectly, through the formulation and execution of the dissertation that may benefit from an appreciation of the analytical techniques and general concepts covered in the course

Promotion of transferable skills

The discussion sessions encourage group co-operation and teamwork. The practical exercises develop general laboratory and observational skills. The course provides experience in numerical data handling and report writing.

6.5 GG5223 Quaternary Mammals

Course Leader

Professor Danielle Schreve

Aims

The course aims to provide students with a theoretical and practical understanding of the value of mammalian fossil material to Quaternary studies and its use in Palaeolithic zooarchaeology. The course promotes a familiarity with the techniques involved in the excavation, identification and analysis of mammalian fossil material, an understanding of taphonomic factors and an awareness of different depositional environments. The course further aims to provide students with an understanding of the principles behind the use of mammalian assemblages in biostratigraphy and the implications for Quaternary climatic and environmental change.
Content

The course will provide a thorough grounding in Quaternary vertebrate (principally mammalian) palaeontology, with particular reference to sampling and processing techniques, taphonomy and the description, identification and interpretation of vertebrate assemblages against a background of Quaternary climatic and environmental change. The detailed syllabus covers the following topics:

- Site formation processes and biases in the fossil record
- Techniques for the collection, processing and analysis of fossil vertebrate remains
- Identification and taxonomy of key vertebrate groups
- Palaeoecology of Quaternary vertebrates
- The application of ancient DNA to Quaternary mammal studies
- European Quaternary mammalian faunal history, including the application of biostratigraphical techniques to sedimentary sequences, evolutionary trends, responses of mammals to Quaternary climatic and environmental change
- Identification of evidence of mammalian exploitation by early hominins
- Quaternary mammals of North and South America and Australia
- Megafaunal extinctions

Teaching format

The course will include lectures, practicals, demonstrations and class discussion. A hands-on approach is encouraged with ample opportunity to handle fossils, casts and recent comparative mammalian material.

Assessment

The course assessment (100%) will take the form of a guided practical exercise (to be written up as a 3000 word report), during which students will be expected to interpret vertebrate assemblages of different ages and from different depositional environments.

Learning outcomes

By the end of the course in which discussion, practical exercises and course work form integral parts, students should have acquired:

- Basic identification skills in a number of key fossil vertebrate group
- An appreciation of the nature of the vertebrate fossil record, with regard to taphonomy
- An understanding of Pleistocene vertebrate faunal histories and their use in biostratigraphy and palaeoecological reconstruction
- A knowledge of early hominin practices relating to mammalian remains
- An awareness of the strengths and weaknesses of vertebrate remains in the interpretation of Quaternary sequences
Assessment goals

The degree to which students have successfully attained these learning outcomes is evaluated:

- Directly through practical exercises requiring the description and identification of key fossil groups
- Directly through the formal assessment, for which students must apply their knowledge of taphonomic processes, vertebrate palaeoecology and biostratigraphy to interpret fossil assemblages
- Indirectly, through the formulation and execution of the dissertation that may benefit from an appreciation of the specific techniques and palaeontological principles, as well as the general concepts covered in the course

Promotion of transferable skills

Vertebrate identification encourages observational and descriptive skills, as well as the application of identification keys. The formal assessment encourages the collection, assimilation and summary of diverse lines of evidence (taphonomic, biostratigraphical, palaeoecological), requiring considerable organisation and presentation skills.

6.6 GG5233 Glaciers in the Climate System

Course Leader

Dr Richard Jones (Durham University)

Aims

To give students an introduction to the key concepts and methods used in modern glacial geology and glaciology, including process glaciology, glacial geology and numerical ice-sheet modelling.

Content

The detailed syllabus will include some or all of the following topics:

- Techniques for constraining past and present glacier dynamics
- Methods for extrapolating these changes using numerical models
- Practical experience of numerical modelling, GIS, remote sensing, and ice penetrating radar.

Teaching format

The course consists of lectures, practical classes and informal class discussions. Lectures will introduce the fundamental principles, whilst practical classes will encourage deeper, active learning. These practical classes will provide students with key experience in numerical modelling, GIS and remote sensing, and ice penetrating radar.

Assessment
a) A 1000 word report on one of the three practical exercises conducted in the class (33% of marks for the course).

b) A 2000 word essay on one of a series of possible essay questions, exploring themes introduced in the module (67% of marks for the course).

Learning outcomes

By the end of this course, in which practical exercises and assessed coursework form an integral part, students should:

- Understand the physical processes of ice flow and mass balance
- Be aware of the limitations and advantages in reconstructing past ice sheets from glaciological and glacial geological data
- Understand the key principles of ice-sheet and glacier modelling
- Have developed skills in quantitative GIS and remote sensing of glaciers
- Understand the role which glaciers and ice sheets play within the climate and ocean system
- Understand the role which radar data plays in understanding ice-sheet and glacier dynamics and thermal regime

Assessment goals

The degree to which students have successfully attained these learning outcomes is evaluated:

- Directly through a series of practical sessions
- Directly through the summatively-assessed course work
- Indirectly through the formulation and execution of dissertations which may benefit from an appreciation of the key concepts and methods used in modern glacial geology and glaciology

Promotion of transferable skills

The course paper requires critical reading and the assimilation of a wide range of data. The ability to reduce this information to a specified word limit and communicate concisely is developed. The practical exercises will enhance data handling, numerical and statistical skills.

6.7 GG5290 Tephrochronology

Course leader

Dr Ian Matthews

Aims

To give students an introduction to the scientific underpinning of tephrostratigraphy and tephrochronology and the essential practical skills required to undertake tephra studies in palaeoenvironmental records.
Content

The detailed syllabus includes the following topics:

- Volcanological background to tephrochronology and tephrostratigraphy
- Transport, deposition and stratigraphic issues in distal tephra research
- Identification and extraction of distal tephra
- Geochemical characterization of tephra
- Age modelling and tephrochronology

Teaching format

The course is based upon lectures, and practical classes, with about 50% of the course being based around practical teaching.

Assessment

Building on the skills and information acquired during the practical sessions, students will prepare a research paper on the identification, correlation and age modelling of tephra located in the cores they have been analysing. This should be concise and of a style suitable for an academic journal (3000 words).

Learning outcomes

By the end of this course, in which practical exercises and assessed coursework form an integral part, students should:

- Be aware of the scientific underpinning of tephra research
- Be aware of methodologies used to identify and correlate tephra
- Be aware of the potential for improving age models based by integrating tephra with other dating and correlation methods
- Be able to extract distal ash from host sediments, identify microscopic tephra and evaluate tephra chemical data
- Be able to integrate tephra with various dating methods

Assessment goals

The degree to which students have successfully attained these learning outcomes is evaluated:

- Directly through the formally-assessed course work consisting of a focused research paper
- Directly through a set of non-assessed practical exercises which culminate in the production of a tephra correlation exercise
- Indirectly, through the formulation and execution of the dissertation that may benefit from an appreciation of the analytical techniques and general concepts covered in the course
Promotion of transferable skills

The course paper requires critical reading and the assimilation of a wide range of information. The ability to integrate this with data from the practical exercises is a key skill across a range of sciences. The course paper should be in the style of a scientific paper, developing or affirming the knowledge of the technical requirements of such a publication. Tephra identification requires a set of practical skills applicable in many areas of research, particularly the use of a polarizing microscope. Moreover correlating tephra using chemical and other information, as well as integrating tephra into age models requires developing a range of statistical and numerical skills.

6.8 GG5235 Palaeofires

Course leader
Dr Daniele Colombaroli

Aims

The course will introduce students to the methodology and theory of sediment charcoal analysis in Quaternary records, including laboratory techniques, charcoal identification of source biomass, and numerical techniques to assess fire-vegetation interactions, at different temporal and spatial scales.

Content

This course unit explores the present biogeography of fire, as well as its past temporal evolution over time. Historical aspects of fire trajectories (“Fire history”) are complemented by information about the ecological impacts of fire on vegetation (“Fire ecology”). This broader approach will help developing a more critical understanding of key environmental stressors of ecosystem change, integrating both natural (climatic) factors, and cultural aspects (“The Anthropocene”).

Finally, “hot debate” topics such as fire management and biodiversity conservation will be examined under specific case studies, that are relevant for future social, economic, and environmental changes. The course unit includes a series of practicals focusing on methodological approaches (Charcoal as a fire proxy), state-of-the-art quantitative analyses, and some basic R-programming skills to perform data mining and statistical analysis of palaeoecological data.

Assessment goals

The course assessment is based on a written essay (3000 words) based on the discussion of a selected case-study. Students will have to locate a site based on geographical coordinates, download and plot the data. For their essay, the students will use their acquired skills to highlight:

1) the fire regime properties of the area
2) the dynamic of fire over time, and its effect on vegetation
3) what can we learn from the past to assess future scenarios of global changes.
Learning outcomes

- Understand the present distribution of fires in different biomes, and relative environmental drivers (climate, vegetation, and humans)
- Critically assess data quality and resolution of charcoal records
- Assess the temporal evolution of fire, and the mechanisms maintaining natural vs. anthropogenic systems
- Understand fire ecology in key biodiversity hotspots, including fire impact on vegetation structure and composition
- Undertake basic programming in R

Promotion of transferable skills

The theoretical background, together with acquired skills for numerical data analyses and interpretation, will provide knowledge to design and implement a research study on the history and ecology of fire, and for addressing present ecological questions about forest conservation and biodiversity in a future changing world.
7 Guidelines for the preparation and submission of the MSc Dissertation

7.1 Overview
A dissertation forms an integral, assessed component of the MSc degree programme. This should report the results of an original piece of research that includes fieldwork and/or laboratory analyses on a topic relevant to the MSc programme syllabus. Dissertations must be submitted typed on A4 paper following the instructions set out below, and the whole report, including all figures and tables, should also be submitted in electronic form, this to accompany the paper copy by the set deadline.

Dissertations should include:
(i) a clear statement and explanation of the problem being examined;
(ii) relevant background information, including a concise literature review and evaluation of proposed methodology;
(iii) details of the data collected and the various analyses carried out;
(iv) interpretation of results;
(v) discussion of the wider context and relevance of the results;
(vi) conclusion(s).

The written text should be supplemented by appropriate tables, maps, diagrams, photographs and other illustrative material. The dissertation should not exceed 10,000 words in the main text. This excludes the abstract, acknowledgements, title page, contents page, list of figures and tables, figure and table captions and the bibliography.

7.2 Timetable
Key deadlines are indicated in Table 2 below. All submission deadlines are at 4 pm on the day indicated.

Table 2. Key deadlines associated with preparation and submission of the dissertation. All deadlines are at 4 pm.

<table>
<thead>
<tr>
<th>Course</th>
<th>Submission Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Dissertation proposal form, countersigned by prospective supervisor</td>
<td>3 May</td>
</tr>
<tr>
<td>Dissertation proposal oral presentations (formative)</td>
<td>9 May</td>
</tr>
<tr>
<td>Final dissertation proposal form</td>
<td>11 May</td>
</tr>
<tr>
<td>1000 word report of progress submitted to supervisor (formative)</td>
<td>11 July</td>
</tr>
<tr>
<td>Title of dissertation submitted to MSc course director</td>
<td>17 August</td>
</tr>
<tr>
<td>GG5299 Dissertation submission</td>
<td>22 Aug</td>
</tr>
<tr>
<td>GG5234 Oral presentation of dissertation results</td>
<td>29 Aug</td>
</tr>
</tbody>
</table>

Dissertation proposal forms
Shortly after the Easter field course, the initial dissertation proposal form, counter-signed by the prospective supervisor, must be submitted to the director of the programme. The proposal should include as full as possible an account of the main research aims, methodology, location of field or lab work and any budgetary considerations (e.g. costs of running particular analyses and how these will be financed).
In early May, each student will then be required to make a ten minute dissertation proposal oral presentation (followed by questions) of their dissertation project in front of staff and postgraduates, at which staff will give feedback to improve the proposals. Final dissertation proposals, taking into account this feedback, should then be submitted to the Programme Director (deadline in Table 2).

**Students who have not submitted their research proposal will not be allowed to proceed to do their fieldwork and dissertation.** Approval of the research proposal is required before candidates are permitted to start field or laboratory work for the main research. The supervisor will then proceed, with the student, to complete the Departmental risk assessment forms.

**Supervision and submission of written work for formative feedback**
Supervisors will provide guidance on appropriate techniques and approaches. During the summer vacation, there is no formally scheduled contact with supervisors during this period, although it is expected that students will consult them as appropriate to discuss progress of their research and writing.

Supervisors are, however, **NOT permitted** to comment on on draft chapters of the dissertation beyond a short (less than 1000 words) report of progress, which should be submitted in writing to your supervisor in mid-July (see Table 2), **unless** alternative arrangements have been made (such as a workshop, or personal meeting for oral report on progress).

**Submission of dissertation title and final dissertation**
Titles of dissertations in their final form must be submitted to the Programme Director by the deadline indicated in Table 2.

The completed dissertation **AND** an electronic copy must meet the guidelines outlined below, and the deadline highlighted in Table 2. The text of the dissertation must also be submitted to Turnitin by the same deadline.

Any dissertations received after the submission date will **NOT** be marked but referred to the main Board of Examiners Meeting for appropriate action. Please calculate carefully the amount of time needed for carrying out the field and laboratory work and writing, typing and producing the final dissertation.

**7.3 Submission Details**
**TWO** identical copies of the dissertation must be submitted by the prescribed submission date, on both Turnitin and in hard copy. These two hard copies should be spiral bound. Please liaise with Jenny Kynaston and allow adequate time for this if you are arranging for it to be done in the department.

In addition, an electronic copy of the final and complete version of the dissertation (including figures) should also be submitted on a CD or USB drive (which will not be returned to you), along with the two paper copies of the thesis by the same deadline. **This electronic copy should take the form of a single .pdf file, to facilitate distribution to future MSc students.**
7.4 Preparation of the dissertation

Dissertations must conform to the following layout unless alternative arrangements have been given prior approval by the Programme Director.

1. Written Report
   (a) Dissertations should not be more than 10,000 words in length. You are advised that conciseness is a desirable quality in producing a scientific report and your ability to write concisely will be assessed. A report in excess of 10,000 words will be subject to the penalties outlined in College Postgraduate Taught Degree Regulations.

   (b) Page sizes for the dissertation are to be A4

   (c) Dissertations must be typed, using font size 12, preferably in Times New Roman or Arial and line spacing 1.5 (single spacing may be used in figure captions, tables, headings and list of references, and also in appendices)

   (d) The title page of the dissertation should state the following:-

      (i) The title of the dissertation in capitals centrally placed.

      (ii) Centrally placed below the title, the author's name and initials.

      (iii) Towards the bottom of the page in smaller font, the words "submitted as an integral part of the Masters of Science Degree in Quaternary Science, Royal Holloway, University of London. This report presents the results of original research undertaken by the author and none of the results, illustrations or text are based on the published or unpublished work of others, except where specified and acknowledged. This text does not exceed the 10,000 word limit, being...words in length (excluding bibliography, appendices and illustrations)". (insert relevant word count).

      (iv) At the bottom of the page, right-hand side, the date of submission and the candidate's signature.

   (e) It is recommended that the form and the sequence of the dissertation should be as follows:-

      (i) Title page

      (ii) Abstract

      (iii) Acknowledgements

      (iv)Contents

      (v) List of tables

      (vi) List of figures and maps

      (vii) Introduction/introductory chapters, outlining the scientific problem and approach, with (where appropriate) a concise literature review and an evaluation of the proposed methodology

      (viii) The main body of the dissertation, suitably arranged in parts, sections or chapters. This section should cover matters such as site descriptions, laboratory analyses, interpretations of results.

      (ix) Discussion, setting the results in the wider context and emphasising critical comparisons
(x) Conclusion, concisely restating the findings and indicating the advances the work has made and its scientific relevance

(xi) Bibliography, conforming to the style of presentation in *Journal of Quaternary Science* (title of journals and books must be in full). Referencing within the dissertation should conform to the Harvard System, i.e. references in the text should give the surname of the author and the year of publication in brackets, for example, Collins (1970) or (Smith & Jones, 2001), followed by a, b, etc. when two or more references to work by one author are given for the same year - e.g. (Harris, 1996c). Page numbers should be given for quotes, for example, (Collins, 1970: 42). At the end of the text the references should be listed in a single bibliographical list, in alphabetical order of authors’ names and in chronological order for each author.

(xii) Appendix/appendices

(f) Only *one side of a sheet* should be used for text or illustrative material. To allow for binding, the left margin should be 3.5 cm and a 2.5 cm right margin is recommended. All pages must be numbered.

2. Presentation of figures

(a) Figures (including maps) should be clear and produced to a publishable standard. Normally this will involve production using a graphics package (e.g. Adobe Illustrator, CorelDraw) but hand-drawn is acceptable (see 2b). Allowance for margins should be as described above. Maps or diagrams larger than A4 should be avoided if possible, and kept to a minimum where essential.

(b) Any figures that are hand-drawn are to be drawn in waterproof ink on smooth white paper or on tracing material. However, lettering must be mechanically or electronically formed (e.g. computer-generated), not freehand.

(c) Descriptive, clearly worded legends should accompany all the maps, diagrams, figures, tables and plates, and the source(s) must be cited always. Captions should be typed at the base of the figure (not on figures) in the fashion adopted by major science journals.
## 8 Marking criteria

<table>
<thead>
<tr>
<th>Grade</th>
<th>%</th>
<th>Grade description for Coursework</th>
<th>Grade description for Dissertation</th>
<th>Grade description for Fieldwork Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>85+</td>
<td>Deep understanding; near-comprehensive knowledge; significant originality in interpretation or analysis; coherent structure (may show significant innovation in organisation); intensive, detailed and critical reading with independent reading beyond reading lists; excellent presentation; referencing and bibliography of publishable quality; incisive and fluent style with no or very minor errors of spelling, punctuation or grammar; high levels of ability in analysis of quantitative or qualitative information (where appropriate)</td>
<td>Significant and highly original contribution to Ordinary Science; professional level of understanding of the main issues, concepts, underlying principles and mastery of the relevant literature; significant originality in construction of main research aims and questions; substantial original fieldwork or other independent research; high ability in appropriate techniques; critical commentary on research design and methodology; coherent structure; in-depth reading; excellent presentation with referencing and bibliography of publishable standard; no or very minor errors of spelling, punctuation or grammar; publishable as a journal paper with only minor revision.</td>
<td>Exemplary formulation of the project aims and structure; very clear scientific and regional context provided that underlie the project’s rationale; reference to relevant literature concerning the project setting is succeeded and incisive; the appropriate methods and their limitations are clearly explained; the data are presented in a clear manner, and represent a solid body of work within the time allowed; the standard of presentation of figures, tables, text, reference list and appendices (where appropriate) are of good quality, including spelling and grammar; some critical awareness of the limitations in (i) the methods adopted, (ii) the data collected and (iii) interpretations of the data; the project shows appropriate critical awareness of the limitations of the project. For an A+ grade, all of these criteria should be met; for an A or A- grade, a number of these criteria must be met; the grade awarded depending on the overall balance.</td>
</tr>
<tr>
<td>A</td>
<td>75-84</td>
<td>Deep understanding; detailed knowledge; may show some originality in interpretation or analysis; coherent structure (may show some innovation in organisational form); in-depth reading (with other independent reading beyond any reading list given or intensive, detailed and critical reading of suggested material); excellent presentation; referencing and bibliography close to publishable standard; incisive and fluent style with no significant errors of spelling, punctuation or grammar; high levels of ability in analysis of quantitative or qualitative information (where appropriate).</td>
<td>Deep understanding of subject area; some originality in construction of main research aims and questions; substantial original fieldwork or some other independent research; high ability in appropriate techniques; critical commentary on research design and methodology; coherent structure; in-depth reading; well presented with referencing and bibliography of publishable standard; no or very minor errors of spelling, punctuation or grammar; some additional work would be required to bring to publishable standard but demonstrates professional standards of research.</td>
<td>Clear formulation of the project aims and structure; clear scientific and regional context that underlie the project’s rationale; adequate reference to relevant literature concerning the project setting; the appropriate methods and limitations adequately explained; a data presented in a clear manner, and represent a solid body of work within the time allowed; the standard of presentation of figures, tables, text, reference list and appendices (where appropriate) are of variable quality, including spelling and grammar; the report lacks critical awareness of the limitations in (i) the methods adopted, (ii) the data collected and (iii) interpretations of the data; the project shows inappropriate critical awareness of the overall achievements of the project. For a B+ grade, all of these criteria should be met; for a B or B- grade, several of these criteria must be met; the grade awarded depending on the overall balance.</td>
</tr>
<tr>
<td>B+</td>
<td>67-69</td>
<td>Good understanding; wide-ranging knowledge; direct focus on subject; coherent structure; evidence of in-depth reading; well presented with clear referencing and properly formatted bibliography; fluent style, few errors of spelling, punctuation or grammar; data presented in a manner, and represent a solid body of work within the time allowed; the standard of presentation of figures, tables, text, reference list and appendices (where appropriate) are of good quality, including spelling and grammar; some critical awareness of the limitations in (i) the methods adopted, (ii) the data collected and (iii) interpretations of the data; the project shows appropriate critical awareness of the limitations of the overall achievements of the project. For a C+ grade, all of these criteria should be met; for a C or C- grade, a number of these criteria must be met; the grade awarded depending on the overall balance.</td>
<td></td>
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<tr>
<td>B</td>
<td>60-62</td>
<td>Basic understanding and awareness of the main issues, concepts, underlying principles and of some key literature but lacking in-depth reading; maintains focus on question; satisfactory organisation and presentation but may have some errors of spelling, punctuation or grammar; familiarity with correct strategies for analysis of quantitative or qualitative data (where appropriate) but possibly with errors in process of analysis; analysis and/or synthesis not well developed.</td>
<td>Basic understanding of subject area; clear statement of research aims and questions; significant original fieldwork or some other independent research; familiarity with appropriate techniques (some errors in application); basic account of methods; adequate structure; some evidence of reading; adequately presented, some referencing and short bibliography; fluent style; few errors of spelling, punctuation or grammar</td>
<td>Project aims and structure are adequate, but could be fuller and clearer; scientific and regional context that underlie the project’s rationale are addressed, but could be better explained; limited reference to relevant literature concerning the project setting; appropriate methods and their limitations are not fully explained; data are presented, but could be organised better or explained more clearly; the amount of data presented are less than might reasonably be expected in the time available; the standard of presentation of figures, tables, text, reference list and appendices (where appropriate) are of variable quality, including spelling and grammar; the report lacks critical awareness of the limitations in (i) the methods adopted, (ii) the data collected and (iii) interpretations of the data; no clear conclusions are provided, or they may not adequately reflect the data and the project’s rationale; Where all or the majority of these criteria apply, a C- grade will be awarded; where performance exceeds some of these criteria, a C or C+ will be awarded, depending on the overall balance of performance.</td>
</tr>
<tr>
<td>C+</td>
<td>57-59</td>
<td>Basic understanding and awareness of the main issues, concepts, underlying principles and of some key literature but lacking in-depth reading; maintains focus on question; satisfactory organisation and presentation but may have some errors of spelling, punctuation or grammar; familiarity with correct strategies for analysis of quantitative or qualitative data (where appropriate) but possibly with errors in process of analysis; analysis and/or synthesis not well developed.</td>
<td>Basic understanding of subject area; simple statement of research aims and questions; original fieldwork or some other independent research; familiarity with appropriate techniques (some errors in application); simple account of methods; very limited further reading; significant weaknesses in presentation; little or no referencing; an inadequate or absent bibliography; straightforward style; some errors of spelling, punctuation or grammar.</td>
<td>The project aims are poorly explained and overall structure is weak; the scientific and regional context that underlie the project’s rationale are not well formulated; reference to relevant literature concerning the project setting is limited; the appropriate methods and their limitations are poorly explained; the data are presented, but are inadequate in amount or quality; the standard of presentation of figures, tables, text and appendices (where appropriate) are of general poor quality; the report lacks critical awareness of the limitations in (i) the methods adopted, (ii) the data collected and (iii) interpretations of the data; no clear conclusions are provided, or they are not clearly related to the limitations in the data presented. Where all or the majority of these criteria apply, a D+ grade will be awarded; where performance is at the low end of these criteria, a D or D- grade will be awarded, depending on the overall balance of performance.</td>
</tr>
<tr>
<td>C</td>
<td>53-56</td>
<td>Basic understanding and awareness of the main issues, concepts, underlying principles and of some key literature but lacking in-depth reading; maintains focus on question; satisfactory organisation and presentation but may have some errors of spelling, punctuation or grammar; familiarity with correct strategies for analysis of quantitative or qualitative data (where appropriate) but possibly with errors in process of analysis; analysis and/or synthesis not well developed.</td>
<td>Limited understanding of subject area; confused or vague research aims or questions; limited original fieldwork or other independent research; very general familiarity with appropriate techniques (significant errors in application); simple account of methods; very limited further reading; significant weaknesses in presentation; little or no referencing; an inadequate or absent bibliography; simple style; significant errors of spelling, punctuation or grammar</td>
<td>The project aims are poorly explained and overall structure is weak; the scientific and regional context that underlie the project’s rationale are not well formulated; reference to relevant literature concerning the project setting is limited; the appropriate methods and their limitations are poorly explained; the data are presented, but are inadequate in amount or quality; the standard of presentation of figures, tables, text and appendices (where appropriate) are of general poor quality; the report lacks critical awareness of the limitations in (i) the methods adopted, (ii) the data collected and (iii) interpretations of the data; no clear conclusions are provided, or they are not clearly related to the limitations in the data presented. Where all or the majority of these criteria apply, a D+ grade will be awarded; where performance is at the low end of these criteria, a D or D- grade will be awarded, depending on the overall balance of performance.</td>
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<tr>
<td>D+</td>
<td>47-49</td>
<td>Some general understanding and knowledge; weakness in detail; may lack clear focus on the assignment; simple content; drawing exclusively on lecture material; no or very limited evidence of outside reading; significant weakness in presentation; little or no referencing; inadequate or missing bibliography; simple style; significant errors in grammar, spelling, and punctuation; familiarity with correct strategies for analysis of quantitative data, but significant errors in the process of analysis.</td>
<td>Limited understanding of subject area; confused or vague research aims or questions; limited original fieldwork or other independent research; very general familiarity with appropriate techniques (significant errors in application); simple account of methods; very limited further reading; significant weaknesses in presentation; little or no referencing and an inadequate or absent bibliography; simple style; significant errors of spelling, punctuation or grammar.</td>
<td>The project aims are poorly explained and overall structure is weak; the scientific and regional context that underlie the project’s rationale are not well formulated; reference to relevant literature concerning the project setting is limited; the appropriate methods and their limitations are poorly explained; the data are presented, but are inadequate in amount or quality; the standard of presentation of figures, tables, text and appendices (where appropriate) are of general poor quality; the report lacks critical awareness of the limitations in (i) the methods adopted, (ii) the data collected and (iii) interpretations of the data; no clear conclusions are provided, or they are not clearly related to the limitations in the data presented. Where all or the majority of these criteria apply, a D+ grade will be awarded; where performance is at the low end of these criteria, a D or D- grade will be awarded, depending on the overall balance of performance.</td>
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<tr>
<td>D</td>
<td>43-46</td>
<td>Limited general understanding; sketchy coverage; with some significant errors in factual details; lack of clear focus on question; poor structure, drawing exclusively on lecture material; limited evidence of outside reading; significant weaknesses in presentation; no evidence of further reading; poorly presented with errors in referencing and poorly formatted bibliography; sketchy style; significant errors of spelling, punctuation or grammar; bare familiarity with correct strategies for analysis of quantitative data, with substantial errors in the process of analysis.</td>
<td>Very limited understanding of subject area; confused or vague research aims or questions; very limited original fieldwork or other independent research; bare familiarity with appropriate techniques (substantial errors in application); vague presentation of methods; vague or limited fieldwork; vague structure; no further reading; poorly presented; little or no referencing and an inadequate or absent bibliography; sketchy style; significant errors of spelling, punctuation or grammar.</td>
<td>The project aims are poorly explained and overall structure is weak; the scientific and regional context that underlie the project’s rationale are not well formulated; reference to relevant literature concerning the project setting is limited; the appropriate methods and their limitations are poorly explained; the data are presented, but are inadequate in amount or quality; the standard of presentation of figures, tables, text and appendices (where appropriate) are of general poor quality; the report lacks critical awareness of the limitations in (i) the methods adopted, (ii) the data collected and (iii) interpretations of the data; no clear conclusions are provided, or they are not clearly related to the limitations in the data presented. Where all or the majority of these criteria apply, a D+ grade will be awarded; where performance is at the low end of these criteria, a D or D- grade will be awarded, depending on the overall balance of performance.</td>
</tr>
<tr>
<td>F+</td>
<td>30-39</td>
<td>No understanding of the subject; fails to address the topic in any meaningful way; information largely erroneous or has little or no relevance to the topic</td>
<td>No understanding of subject area; no clear research aims or questions; no evidence of original fieldwork or other independent research; serious factual errors, little or no scientific and regional context.</td>
<td>No project aims are provided or the aims are not achievable in the time available; the report lacks structure; little or no scientific and regional context.</td>
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</table>

PASSMARK 50%
<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
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<tbody>
<tr>
<td>F-</td>
<td>1-19</td>
</tr>
<tr>
<td></td>
<td>No understanding of the subject; fails to address the topic in any meaningful way; information erroneous or has no relevance to the topic; incomplete, fragmentary or chaotic structure; no evidence of further reading; poorly presented; no referencing; inadequate or absent bibliography; inadequate style; substantial errors of spelling, punctuation or grammar; substantial error and confusion over appropriate analysis of quantitative data; complete inability to analyse information.</td>
</tr>
<tr>
<td>F</td>
<td>20-29</td>
</tr>
<tr>
<td></td>
<td>No understanding of subject area; no clear research aims or questions; no original fieldwork or other independent research; no analytical work; no discussion of methods; inadequate structure — fragmentary; incoherent or incomplete; no further reading; poorly presented, with no referencing of sources and an inadequate or absent bibliography; no referencing and an inadequate or absent bibliography; inadequate style; substantial errors of spelling, punctuation or grammar.</td>
</tr>
</tbody>
</table>

Confusion over techniques; no serious discussion of methods; inadequate structure; no further reading; poorly presented, with no referencing of sources and an inadequate or absent bibliography; no referencing and an inadequate or absent bibliography; inadequate style; significant errors of spelling, punctuation or grammar; significant confusion over appropriate analysis of quantitative data; analytical work incomplete and erroneous. Is provided; there is little or no reference to relevant literature concerning the project setting; the appropriate methods and their limitations are very poorly explained; few data are presented, or they are very inadequate in amount or quality; the standard of presentation of figures, tables, text, reference list and appendices (where appropriate) is very poor, including spelling and grammar; the report lacks critical awareness of the limitations in (i) the methods adopted, (ii) the data collected and (iii) interpretations of the data; no conclusions are provided concerning the data presented. Where all or the majority of these criteria apply, an F- grade will be awarded; where performance exceeds some of these criteria, an F or F+ grade will be awarded, depending on the overall balance of performance.
<table>
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<th>Grade</th>
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<th>Grade description for Oral Presentation</th>
<th>Grade description for Web Presentation</th>
<th>Grade description for GG5291</th>
</tr>
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<tr>
<td>A+</td>
<td>85+</td>
<td>An exceptionally effective presentation. Extremely clear structure, with ideas linked coherently; aims presented clearly and evidence of comprehensive research; considerable novelty in construction and design; pages visually well balanced with appropriate font, size and use of colour; excellent use of illustrations; excellent functionality with links all working; perfectly pitched to promote public understanding of science (authoritative yet accessible); absence of jargon and/or comprehensive glossary provided. Produced to a professional standard.</td>
<td>Has the potential to make a significant and highly original contribution to Quaternary Science; significant level of understanding of main issues, concepts, underlying principles and mastery of the relevant literature; significant originality in construction of main research aims; innovative materials and methods used to achieve research objectives; critical commentary on research design and methodology; incisive and fluent style; professionally presented with referencing and bibliography of publishable standard; no or very minor errors of spelling, punctuation or grammar; no or very limited additional work required to bring to professional standards of research design.</td>
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<td>A</td>
<td>75-84</td>
<td>Presentation addresses explicitly the topic, identifying subtitles in detail of research presented; clear and original structure of content and conclusions; ideas linked coherently and authoritatively; evidence of comprehensive research and original thought in construction; pitch of voice and audio-visual aids used to a professional standard; appropriate pacing and speed to time; eye contact and body language excellent; gauged the needs of the audience and encouraged appropriate involvement and questioning, answering with authority and/or originality. Standard of a first-rate conference presentation.</td>
<td>Deep understanding of subject area; some originality in construction of research aims; detailed scientific background and research rationale; clear statement of research aims and questions; methods and materials presented ideally suited to achieving research objectives; critical commentary on research design and methodology; coherent structure; in-depth reading; excellent presentation with referencing and bibliography of publishable standard; no or very minor errors of spelling, punctuation or grammar; some additional work would be required to bring to professional standards of research design.</td>
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<tr>
<td>A-</td>
<td>70-74</td>
<td>Explicitly addresses the topic; structure evident but could be more focussed; evidence of coherent links between content or conclusions; ideas linked coherently; evidence of original thought with respect to structure of material presented; well-structured and relevant analysis; consultation and evaluation of a broad range of relevant sources; clearly audible presentation, audio-visual aids used to increase effectiveness; almost entirely appropriately paced and run close to time; eye contact and body language used for most of the presentation; obvious attempt to gauge audience needs; encouraged appropriate involvement and questioning, demonstrating knowledge and understanding in answers.</td>
<td>Good understanding of subject area, appropriate research aims; good scientific background and research rationale; clear statement of research aims and questions; scientific objectives achievable using the materials and methods proposed; some evaluation of research aims and questions; evidence of coherence; in-depth reading; well-presented with referencing and bibliography of publishable standard; no or very minor errors of spelling, punctuation or grammar.</td>
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<tr>
<td>B+</td>
<td>67-69</td>
<td>Addresses the topic; evidence of structure but could be improved; evidence of coherent links between most ideas; commencement and conclusion could have been more appropriate; included some analysis; evidence that some relevant sources were consulted but could have been evaluated more effectively; audible for all of the presentation; visual aids were used, although some lack of planning; pace not always appropriate and ran over/under time; more use of eye contact and body language could have been made; audio needs not well-gauged and limited encouragement to participation/question; answers with basic understanding or hesitancy.</td>
<td>Basic understanding of subject area; simple or unoriginal research aims and questions; basic scientific background and research rationale; possibly containing minor factual errors; basic statement of research aims and questions; familiarity with appropriate materials and methods (some errors in application); back of hand reading; some referencing and short bibliography; straightforward style; some errors of spelling, punctuation or grammar.</td>
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<td>B</td>
<td>60-62</td>
<td>Only partially addresses the topic; some evidence of appropriate structure but presentation is partially rambling or unstructured; ideas could have been linked more coherently; commencement and conclusion with some hesitation or confusion; included little or no analysis; few relevant sources presented and little evaluation made; presentation ran over/under time; presentation paced too fast or too slow to be effective; presenter slightly inaudible; audio-visual aids not very effective (including having too many slides); little use of eye contact or body language; audience needs not taken into account in design of the presentation; no attempt to encourage appropriate audience involvement and questioning, and some weaknesses in basic understanding indicated in answers.</td>
<td>Limited understanding of subject area; confused or vague research aims or questions; limited scientific background and research rationale, possibly containing major factual errors; very limited statement of research aims and questions; very general familiarity with appropriate techniques (significant errors in application); inaccurate evaluation of methods; very limited further reading; significant weaknesses in referencing and an inadequate or absent bibliography; simple style; significant errors of spelling, punctuation or grammar.</td>
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<tr>
<td>B-</td>
<td>57-59</td>
<td>A poor presentation. Structure is confused, with no clear linkage of ideas; aims are present but not adequately defined; research is presented in cursory fashion or so jargon-heavy as to be limited use to a non-specialist audience; poor design with page layout jumbled, inappropriate use of fonts and colour; images poorly chosen, unclear, too many or too few; text may have significant errors of spelling, punctuation or grammar; overall functionality poor; makes little attempt to engage with wider public understanding of science.</td>
<td>Very limited understanding of subject area; confused or vague research aims or questions; very limited scientific background; research rationale entirely unoriginal or based upon significant misunderstanding; no statement of research aims or questions; basic familiarity with appropriate techniques (substantial errors in application); vague or confused discussion of methods; sketchy structure; no further reading; poorly presented; little or no referencing and an inadequate or absent bibliography; sketchy style; significant errors of spelling, punctuation or grammar.</td>
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<td>C</td>
<td>53-56</td>
<td>The presentation is rambling or unstructured; ideas could have been linked more coherently; commencement and conclusion with some hesitation or confusion; included little or no analysis; few relevant sources presented and little evaluation made; presentation ran over/under time; presentation paced too fast or too slow to be effective; presenter slightly inaudible; audio-visual aids not very effective (including having too many slides); little use of eye contact or body language; audience needs not taken into account in design of the presentation; no attempt to encourage appropriate audience involvement and questioning, and some weaknesses in basic understanding indicated in answers.</td>
<td>Limited understanding of subject area; confused or vague research aims or questions; limited scientific background and research rationale; possibly containing minor factual errors; basic statement of research aims and questions; few or no errors of spelling, punctuation or grammar; no or very limited additional work required to bring to professional standards of research design.</td>
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<td>C-</td>
<td>50-52</td>
<td>Largely fails to address the topic; rambling or unstructured; commenced and concluded with hesitation or confusion; included little or no analysis; few relevant resources consulted, and little evaluation made of them; partially inaudible; audio-visual aids not used or used ineffectually; ran so quickly over- or under-time; presentation paced too fast or too slow to be effective; did not engage the audience with eye contact and body language; attempted to gauge audience needs; no attempt to encourage appropriate audience involvement and questioning; answers largely erroneous or had little or no relevance to the topic.</td>
<td>Poorly presented; structure is confused, with no clear linkage of ideas; aims are present but not adequately defined; research is presented in cursory fashion or so jargon-heavy as to be limited use to a non-specialist audience; poor design with page layout jumbled, inappropriate use of fonts and colour; images poorly chosen, unclear, too many or too few; text may have significant errors of spelling, punctuation or grammar; overall functionality poor; makes little attempt to engage with wider public understanding of science.</td>
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<tr>
<td>D+</td>
<td>47-49</td>
<td>Presentations are clear and complete, although some lack of planning; pace not always appropriate and ran over/under time; more use of eye contact and body language could have been made; audio needs not well-gauged and limited encouragement to participation/question; answers with basic understanding or hesitancy.</td>
<td>Poor presentation; structure is confused, with no clear linkage of ideas; aims are present but not adequately defined; research is presented in cursory fashion or so jargon-heavy as to be limited use to a non-specialist audience; poor design with page layout jumbled, inappropriate use of fonts and colour; images poorly chosen, unclear, too many or too few; text may have significant errors of spelling, punctuation or grammar; overall functionality poor; makes little attempt to engage with wider public understanding of science.</td>
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<td>D</td>
<td>43-46</td>
<td>An extremely poor presentation, making no attempt to engage with the task; inadequate and/or illogical structure; aims absent; research findings presented in very cursory fashion or so jargon-heavy as to be completely ineffective to a non-specialist audience; serious issues over use of language and technical flaws throughout; colour and illustrations absent or used to very poor effect; substantial errors of spelling, punctuation or grammar; no attempt to encourage appropriate audience involvement and questioning.</td>
<td>No understanding of subject area; no clear research aims or questions; no or largely erroneous scientific background and research rationale; serious confusion over techniques; no serious discussion of methods; inadequate structure; no further reading; poorly presented; little or no referencing and an inadequate or absent bibliography; sketchy style; significant errors of spelling, punctuation or grammar.</td>
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<td>D-</td>
<td>40-42</td>
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<td>F+</td>
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<td>F</td>
<td>0-29</td>
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<td>F</td>
<td>20-29</td>
<td>Fails to address the topic; very rambling and unfocussed; commenced and concluded with hesitation or confusion; included no analysis; no resources consulted; presenter was fully or partially inaudible; audio-visual aids not used or used ineffectually; ran severely over- or under-time; presentation paced too fast or too slow to be effective; did not engage the audience with eye contact or body language; no attempt to gauge audience needs; no attempt to encourage appropriate audience involvement and questioning; unable or unwilling to answer questions</td>
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<td>F-</td>
<td>1-19</td>
<td>No understanding of subject area; no clear research aims or questions; no or entirely erroneous scientific background and research rationale; techniques inappropriate; inadequate structure — fragmentary, incoherent or incomplete; no further reading; poorly presented, with no referencing of sources and an inadequate or absent bibliography; inadequate style; substantial errors of spelling, punctuation or grammar.</td>
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<td>Grade</td>
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<td>Grade description for Poster Presentation</td>
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<tr>
<td>A+</td>
<td>85</td>
<td>The aim of the poster is very apparent from immediate impressions; there is considerable originality in the formatting of the poster and exceptional and effective presentation of complex themes; excellent summary of main ideas demonstrating deep awareness of key debates; significant evidence of further reading, with well synthesised supporting information; text excellently presented, quantity and font size extremely effective; clear, relevant illustrations that enhance purpose and interest of poster through synthesis of large datasets and/or ideas; excellent spelling and grammar; fluent style; innovative poster design, allows rapid communication of message; very neat and presentable; good source of further information and excellently presented bibliography. <em>Poster produced to first-rate conference poster session standard.</em></td>
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<td>A</td>
<td>75-84</td>
<td>The aim of the poster is very apparent from immediate impressions; excellent summary of main ideas demonstrating deep awareness of key debates; significant evidence of further reading, with well synthesised supporting information; text excellently presented, quantity and font size extremely effective; clear, relevant illustrations that enhance purpose and interest of poster through synthesis of large datasets and/or ideas; excellent spelling and grammar; fluent style; innovative poster design, allows rapid communication of message; very neat and presentable; good source of further information and excellently presented bibliography. <em>Poster presented to conference poster session standard.</em></td>
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<td>A-</td>
<td>70-74</td>
<td>The aim of the poster is very clear; provides a good summary of main ideas demonstrating awareness of key debates; evidence of further reading, with good supporting information given; text well presented, quantity and font size effective; clear, relevant illustrations that add to purpose and interest of poster and provide a synthesis of key data or ideas; good spelling, grammar and written style; very good poster design, allows communication of message; neat and presentable; further information and bibliography well presented.</td>
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<td>B+</td>
<td>67-69</td>
<td>The poster has a title, but it is unclear immediately what the poster concerns; the main ideas are appropriate to the topic; little evidence of further reading, little supporting information given; text reasonably presented, quantity and font size adequate; there are few illustrations, some appropriate with an attempt to synthesis data or ideas; numerous errors in spelling, grammar or written style; reasonable poster design, allows communication of message; basically presentable; little further information and inadequate bibliography</td>
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<td>B</td>
<td>63-66</td>
<td>The main ideas behind the poster are inappropriate to topic with evidence of error and confusion; no evidence of further reading, little supporting information given; text may be ineffective, too small, unclear; few or no illustrations, uninformative or irrelevant; significant errors in spelling or grammar; sketchy style; poor poster design, hinders communication of message; untidy, messy; no bibliography or further information included</td>
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<td>B-</td>
<td>60-62</td>
<td>The poster may lack a title and makes little attempt to engage with the task, such as the main ideas being inappropriate to the topic; there are numerous errors and ineffective communication of ideas. No supporting information provided and illustrations are either uninformative, poorly reproduced or irrelevant. Text is ineffective, too small, unclear; significant errors in spelling, grammar or written style; poor poster design, hinders communication of message; untidy, messy; no bibliography or further information included</td>
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<td>C+</td>
<td>57-59</td>
<td>The poster has a title, but it is unclear immediately what the poster concerns; the main ideas are appropriate to the topic; little evidence of further reading, little supporting information given; text reasonably presented, quantity and font size adequate; there are few illustrations, some appropriate with an attempt to synthesis data or ideas; numerous errors in spelling, grammar or written style; reasonable poster design, allows communication of message; basically presentable; little further information and inadequate bibliography</td>
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<td>C</td>
<td>53-56</td>
<td>The poster is poor; the main ideas are inappropriate to the topic with evidence of error and confusion; no evidence of further reading, little supporting information given; text may be ineffective, too small, unclear; few or no illustrations, uninformative or irrelevant; significant errors in spelling or grammar; sketchy style; poor poster design, hinders communication of message; untidy, messy; no bibliography or further information included</td>
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<td>C-</td>
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<td>The poster is poor; the main ideas are inappropriate to the topic with evidence of error and confusion; no evidence of further reading, little supporting information given; text may be ineffective, too small, unclear; few or no illustrations, uninformative or irrelevant; significant errors in spelling or grammar; sketchy style; poor poster design, hinders communication of message; untidy, messy; no bibliography or further information included</td>
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<td>The main ideas behind the poster are inappropriate to topic with evidence of error and confusion; no evidence of further reading, little supporting information given; text may be ineffective, too small, unclear; few or no illustrations, uninformative or irrelevant; significant errors in spelling or grammar; sketchy style; poor poster design, hinders communication of message; untidy, messy; no bibliography or further information included</td>
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<td>D</td>
<td>43-46</td>
<td>The poster is poor; the main ideas are inappropriate to the topic with evidence of error and confusion; no evidence of further reading, little supporting information given; text may be ineffective, too small, unclear; few or no illustrations, uninformative or irrelevant; significant errors in spelling or grammar; sketchy style; poor poster design, hinders communication of message; untidy, messy; no bibliography or further information included</td>
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<td>D-</td>
<td>40-42</td>
<td>The poster is poor; the main ideas are inappropriate to the topic with evidence of error and confusion; no evidence of further reading, little supporting information given; text may be ineffective, too small, unclear; few or no illustrations, uninformative or irrelevant; significant errors in spelling or grammar; sketchy style; poor poster design, hinders communication of message; untidy, messy; no bibliography or further information included</td>
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<td>F+</td>
<td>30-39</td>
<td>The poster is poor; the main ideas are inappropriate to the topic with evidence of error and confusion; no evidence of further reading, little supporting information given; text may be ineffective, too small, unclear; few or no illustrations, uninformative or irrelevant; significant errors in spelling or grammar; sketchy style; poor poster design, hinders communication of message; untidy, messy; no bibliography or further information included</td>
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<td>F</td>
<td>20-29</td>
<td>The poster is poor; the main ideas are inappropriate to the topic with evidence of error and confusion; no evidence of further reading, little supporting information given; text may be ineffective, too small, unclear; few or no illustrations, uninformative or irrelevant; significant errors in spelling or grammar; sketchy style; poor poster design, hinders communication of message; untidy, messy; no bibliography or further information included</td>
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<td>F-</td>
<td>1-19</td>
<td>The poster is poor; the main ideas are inappropriate to the topic with evidence of error and confusion; no evidence of further reading, little supporting information given; text may be ineffective, too small, unclear; few or no illustrations, uninformative or irrelevant; significant errors in spelling or grammar; sketchy style; poor poster design, hinders communication of message; untidy, messy; no bibliography or further information included</td>
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9 Selected recent dissertation topics

9.1 Selected dissertation topics 2012/13

Using the ‘Varian VF-50J’ X-ray source in routine luminescence dating of quartz.

Assessing the evidence for a short-lived environmental disturbance event during the early Holocene at Lake Llangorse, South Wales.

A high resolution isotopic record for the Lateglacial Interstadial from Star Carr, North Yorkshire.

The provenance and transport history of igneous clasts in late Quaternary deposits, Northwest Scotland; A pilot study into the use of geochemical methods to discriminate between glacial deposits of different age.

Chironomid-inferred Lateglacial interstadial temperatures from Muir Park, Southern Scotland.

Identification and correlation of cryptotephras from Lake Kushu on Rebun Island, Japan.

The Late-Glacial palaeoenvironmental record from Tirinie, south-east Grampian Highlands: Assessing the vegetative response to abrupt short term climatic change.

Testing the potential for tephra to time glacial retreat: tephrostratigraphic analyses of four Early Holocene sequences from the Scottish Highland.

The Mammalian Assemblages of The Crypt, Creswell Crags, Nottinghamshire.

The landscape evolution of the View Point area of the Glen Roy valley, NW Scotland, during the Loch Lomond Readvance; A detailed sedimentological and geomorphic analysis.

A tephrostratigraphic investigation of mire deposits associated with Viking occupation sites in Greenland

A macro-scale and micromorphological investigation of the genesis of a glacigenic diamicton complex - an example from Happisburgh, North Norfolk.

Lateglacial Stadial paleoclimate reconstruction for the British Isles using high resolution isotope records from carbonate lake systems.
9.2 Selected dissertations topics 2013/14

An investigation into the Lateglacial vegetation history of Arisaig, northwest Scotland.

Utilising palynology and tephrochronology to assess the onset of the Holocene and its potential timing from Kingshouse 2, Rannoch Moor, NW Scotland.

Evidence for and timing of polyphase deformation in a multiple till sequence at Balglass Burn, Central Scotland: A micromorphological approach.

An oxygen isotopic investigation of the Flixton area, North Yorkshire: Implications for the human reoccupation of Britain across the Pleistocene-Holocene transition.

A diatom assessment of a lake sequence from Tanera Mor, Scotland.

A geoarchaeological investigation into the Mid- to Late-Holocene Queens Sedgemoor, Somerset Levels: Pollen and micro-charcoal evidence.

The ability of Bayesian age modelling to refine glacial chronologies in the Late Quaternary: A case study from Highland Asia.

A tephrochronology investigation of Straloch Loch, Scotland.

A lateglacial environmental and temperature record from Wykeham, Yorkshire, interpreted from subfossil beetles (Coleoptera).

A microscale sedimentary investigation of annually laminated sediments in Middle Glen Roy: the implications for site varve chronology.

Stable oxygen isotope ratios in chitin from Alaskan fossil water beetles: Palaeoecological implications and development towards a new palaeotemperature proxy.


The Lateglacial mammalian assemblage from Bridged Pot Shelter, Somerset: taphonomy, palaeoenvironment and age.

Vertebrate response to climatic deterioration in Britain during MIS 5a.
9.3 Selected dissertation topics 2015/16

A lateglacial interstadial chironomid inferred temperature record from the site of Tirinie, Scotland.

Detailed sedimentological and tephrochronological study of annually-laminated deposits at Svardsklova, Southeastern Sweden.

OSL dating of palaeofired hearths from the western Nefud Desert, Saudi Arabia.

A comparison of chironomid-inferred summer temperatures with a Lateglacial pollen record from Tanera Mor, NW Scotland.

Combined use of high resolution remote sensing and field mapping to determine iceflow dynamics on Rannoch Moor, Scotland, during the Loch Lomond Stadial.

Sedimentology of a new deep-water core from Llangorse covering the Last Termination, helping refine the timing of deglaciation.

Chronology and palaeoenvironments of lacustrine sediments in the western Nefud desert, Saudi Arabia.