

## Short Course in Luminescence Dating: Theory, Methods and Application

8<sup>th</sup>-12<sup>th</sup> November 2021, Aberystwyth Luminescence Research Laboratory (ALRL),

Aberystwyth University, UK (in-person only)

**Rationale:** *Luminescence dating* is a rapidly evolving field, and increasingly encompasses a range of techniques and signals used to derive a numerical chronology. The choice of luminescence technique depends upon the materials available for dating, the timescale being considered, the precision required, and the depositional setting from which the sample is taken.

**Audience:** This course provides practical training for participants wishing to design and undertake their own luminescence dating projects applied to archaeological and geological sedimentary deposits, and those who wish to have a better understanding of the method in order to be able to assess published data.

**Course Outline:** The course will cover the evolution of luminescence dating; the selection of the most appropriate luminescence technique, the choice of mineral, aliquot- and grain-size for dating; analysis of complex equivalent dose –distributions; and some of the latest developments in this family of techniques. The limitations and benefits of luminescence techniques will be discussed, as will research design/sampling strategy, and practical considerations whilst taking samples in the field.

### Course structure:

- The principles of luminescence dating of sediments*
- Laboratory preparation of samples for luminescence measurement*
- Determining the environmental dose rate*
- Measurement and determination of equivalent dose*
- Determining a luminescence age*
- Field sampling*
- Case studies and latest advances*

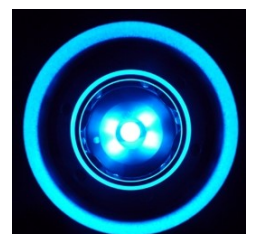
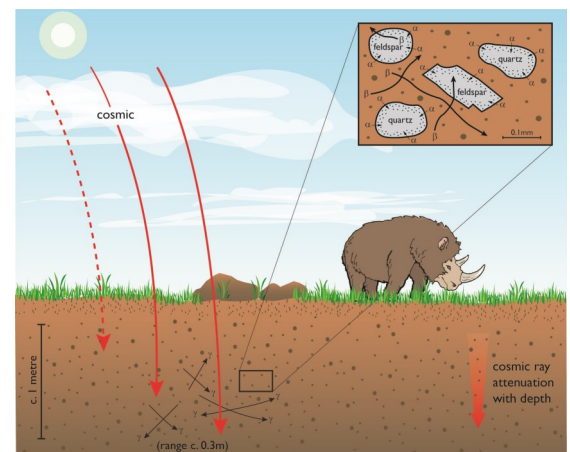
**Cost:** £600 (including all printed materials and laboratory costs, but excluding accommodation and meals)

Aberystwyth Luminescence Research Laboratory (ALRL) has been at the forefront of research into luminescence dating for 30 years, and is one of the best equipped laboratories in the world. ALRL has trained many of the leading scientists in the field today, and has played a key role in the most important innovations in the field during this time.

For further information about the course please contact:

Prof. Helen Roberts ([hmr@aber.ac.uk](mailto:hmr@aber.ac.uk)) or Prof. Geoff Duller ([ggd@aber.ac.uk](mailto:ggd@aber.ac.uk))

Website: [www.aber.ac.uk/alrl](http://www.aber.ac.uk/alrl) Telephone: +44-1970-622606



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Staff involved in leading this course:



**Professor Helen M. Roberts** is Co-Director of the Aberystwyth Luminescence Research Laboratory (ALRL), where she has been based for over 20 years. During this time she has helped to develop the Aberystwyth Luminescence Research Laboratory's international reputation for excellence in luminescence research through the development of both pure and applied research strands. Her current research interests focus on the development and application of luminescence methods for dating Quaternary sediments, with particular interest in rates of geomorphic change, coastal change, studies of deposits of wind-blown dust ('loess') and the dust record, and lacustrine studies.

In addition to undertaking work that applies luminescence techniques for dating within environmental or archaeological settings, Roberts is also involved in the development and testing of luminescence signals and measurement protocols. She has published over 60 research papers in ISI journals (>50 since 2008). Roberts has extensive experience of working with both fine-grained and coarse-grained sediments from a wide variety of depositional environments, and using both quartz and feldspars for dating. She is a Co-I on the Chew Bahir project working with lacustrine cores to decipher the record of environmental change in Ethiopia, testing hypotheses of climate-driven human evolution, innovation, and dispersal. She is Vice-President of the Stratigraphy and Geochronology Commission (SACCOM) of INQUA, the International Union for Quaternary Research.



**Professor Geoff Duller** is the Co-Director of the Aberystwyth Luminescence Research Laboratory. He has undertaken research into the development of luminescence instruments, luminescence methods and the application of luminescence dating methods to Quaternary sediments for over 25 years, and has published over 150 articles in ISI listed journals. His research aim is to develop new equipment and methods for luminescence measurement, and to apply these to solving key issues in Quaternary science. He has pioneered a range of novel luminescence methods, including the development of equipment capable of measuring the luminescence signal from single sand-sized mineral grains, and the application of this equipment to analyse sediments that would otherwise have been difficult or impossible to date. The major applications of single grain analyses pioneered by Duller have been to key Middle Stone Age archaeological sites in southern and eastern Africa, including the key site of Blombos; and to glacial sediments in Chile and the UK, providing absolute chronologies for glacial episodes. He is a key member of the AHRC funded 'Deep Roots of Human Behaviour' and the ERC funded EQUATE project which are exploring the record of Human Evolution in Africa and Europe respectively. He is Associate Editor of *Radiation Measurements*.

In 2012 he was received the Bigsby Medal from the Geological Society of London in recognition of his contribution to the development of luminescence dating.