

CURRICULUM VITAE – DAVID C.W. SANDERSON 28/3/08

PRESENT POSITION : Professor of Environmental Physics, University of Glasgow
Head of Environmental Physics Section, Scottish Universities Environmental Research Centre,
East Kilbride.
Honorary Lecturer in Archaeology, University of Glasgow

DATE OF BIRTH : 21st May 1956

DEGREES : BSc Physics (Durham, 1977); M.Phil (Bradford, 1982) “The Thermoluminescence of Archaeological Glass”, PhD (Paisley, 1987) “Thermoluminescence Dating of Scottish Vitrified Forts”

APPOINTMENTS

2008	Professor of Environmental Physics, University of Glasgow
2004	Reader SUERC
1991	Senior Lecturer, Head of Physics group, SURRC.
1986-90	Lecturer, SURRC, East Kilbride.
1984-86	SERC funded Research Fellow in Physics, Paisley College. Thermoluminescence dating of Scottish Vitrified forts.
1982-84	Research Assistant, Low Level Measurements Laboratory, UKAEA, Harwell. ¹⁴ C dating and environmental studies of small samples.
1981-82	Part time Lecturer, School of Archaeological Sciences, Bradford University.
1979-81	Research Assistant (SERC funded), School of Archaeological Sciences, Bradford University. Analytical studies of archaeological glasses.
1977-78	Research Assistant, TL dating laboratory, Durham University.

RESEARCH INTERESTS, TEACHING AND ADMINISTRATIVE DUTIES

Expertise and Research Interests

My expertise is based in atomic and nuclear physics, with emphasis on energy exchange between nuclear and atomic systems, and with photon detection, development of novel software-controlled instrumentation, modelling physical systems and characterisation of natural and synthetic materials. My research activities are concentrated in environmental and archaeological physics and chronology; measurement of environmental radioactivity using airborne, in-situ and laboratory methods to assess environmental dosimetry and track environmental processes; luminescence dating ; and the physical analysis of food for authenticity purposes. I have also been an honorary lecturer in archaeology in Glasgow for 20 years, reflecting a long standing interest in science applied to the humanities.

Teaching

Teaching activities at SUERC are primarily conducted at research level by direct project supervision. In the last 3 years I have also initiated the introduction of short professional training courses in detection of irradiated foods using EN1788 and EN13751 methods, which have been through 6 successful cycles with exemplary feedback from delegates ranging from scientists in national food authorities to heads of quality assurance from multinational companies. Other teaching experience includes examined courses on nuclear physics (nuclear stability, modes of decay, radioactive decay laws, natural and anthropogenic radionuclides, applications of nuclear science including dating methods); reactor physics (nuclear binding energy, fusion and fission theory, reactor kinetics, reactor designs, the nuclear fuel cycles, compositional changes in

nuclear fuels, nuclear waste management and nuclear accidents); food irradiation (the physical chemical and biological effects of ionising radiation on foods; influence and control of dose, national and international regulatory framework, detection of irradiated foods); and dating methods in archaeology (physical methods, electron spin resonance, stimulated luminescence, environmental dosimetry, applications of luminescence dating to heated materials and sedimentary systems). These have been delivered at Final Year Honours and Masters level to Strathclyde University (Physics Department and Bioscience Division), and to the Archaeology Departments in Glasgow and Edinburgh.

Administrative and Other duties

My administrative and other duties at SUERC encompass areas involving statutory responsibilities for radioactive materials and personnel monitoring; radiation protection supervisor duties; senior responsibility for radioactive materials and Euratom returns; membership of the SURRC Nuclear Safety Committee (since 1986; but since 1995 concerning primarily with decommissioning and de-licensing of the nuclear licensed site). I established, resourced, equipped and manage the luminescence and radiometrics research facilities at SUERC, and have provided group leadership in environmental physics research since 1986.

EXTERNAL DUTIES

Presenter and rapporteur, Invited workshop on detection of Illicit Trafficking of Radioactive Materials, Royal Society, December 2007

Invited member of DEFRA database of experts for consultation during national emergencies, since 2007

Member of Working Group on Long Range Detection of Radiation, Convened by Standing committee for International affairs, Royal Society of London, March 2007.

Member of Dti Photonics Knowledge Transfer Network

Member of Food Standards Agency Food Irradiation Stakeholder Group

Member of European Standards Committee Working Group on Development of international standard methods for detection of irradiated foods (CEN TC 275 WG8).

External Appraiser, Department of Physics, University of York (2006/7), Advising on establishment on MSc course material in environmental radioactivity

Coordinator of European projects to harmonise methods for environmental airborne gamma spectrometry under FP IV and FPV, 1999-2003

Chairman EPSRC Nuclear Applications Workshop, Manchester May 2002, and Steering Committee 2001-2003

Guest Editor, Journal of Environmental Radioactivity Special Issue on Environmental Radiometrics.

Member of Scientific committee for the International INSUME conference series (In-situ metrology)

MAFF Food Authenticity Methods Sub group

Member of International Commission for Radiation Units and Measurements Report Committee on Gamma Spectrometry in the Environment. Author of chapter on Airborne Gamma Spectrometry (ICRU 53).

Regular Referee for Institute of Physics journals, RSC Food and Agriculture, Radiation Measurements, Journal of Environmental Radioactivity, Archaeometry, EPSL and many others

Regular referee for research grant applications from NERC, EPSRC, Royal Society, NSF

POSTGRADUATE SUPERVISION AND EXAMINATION

Supervision – full time research students :

S. Alexander, PhD 2007, Fading of Luminescence of Feldspars, EPSRC funded

I.M.C. Anthony, PhD 2004, Luminescence Dating of Scottish Burnt Stone Mounds : New

results from sites in Orkney and Shetland (Funded by EPSRC).

A.A. Sommerville, PhD University of Glasgow, 2003, Luminescence Dating of Windblown Sands from Archaeological Sites in Northern Scotland.

I.J. Houston, MSc University of Glasgow 2001, Imaging luminescence using focussed stimulation : a potential solution to problems of heterogeneity in dating sedimentary systems.

D.C. White, MSc dissertation, University of Glasgow 2000, A comparative study of Visualised Gamma-ray Spectrometry at various spatial resolutions and for various Interpolation algorithms, Department of Geography and Topographic Science.

J.Q. Spencer, PhD University of Glasgow, 1996, The development of luminescence methods to measure thermal exposure in Lithic and Ceramic Materials (funded by SERC).

A.N. Tyler, PhD University of Glasgow, 1994, Environmental Influences on Gamma Ray Spectrometry (funded by NERC)

J.D. Allyson PhD University of Glasgow, 1994, Environmental Gamma-ray Spectrometry: Simulation of Absolute Calibration of in-situ and Airborne Spectrometers for Natural and Anthropogenic Sources, (SERC funded)

P.A. Clark, PhD University of Glasgow 1994, Isochron Methods for Luminescence Dating in Archaeology (SERC funded)

I.S.J. Bray, PhD University of Glasgow 1994, Geochemical methods for provenance studies of steatite, (SERC funded)

R.J. Clark, PhD University of Glasgow 1992, Photostimulated Luminescence as an Archaeological Dating Tool, (SERC funded)

C. Slater MPhil. University of Strathclyde, 1991, Development of a thermoluminescence method for the detection of Irradiated Herbs and Spices.

Examinations

Djamel Maouche, Magister, University of Algiers, 1989

Makaike Chitambo, Phil , Department of Physics, Sussex University, 1994

Duncan White, D. Phil, Department of Physics, Sussex University, 1995

Ludovic Guillot, PhD, Department of Physics, Universite de Bourgogne, 1996

Sinikka Pinnioja, PhD, Department of Radiochemistry, University of Helsinki, 1998

Jens Hovgaard, PhD, Department of Electrophysics and Automation, Danish Technical University, 1998

PhD Thesis, Department of Physics, University of Southampton, 1999

Annaig Gautier, D. Phil, Research Laboratory for archaeology and the History of Art, University of Oxford, 2000

T. Warneke, PhD, Earth Sciences Department and Southampton Oceanography Centre, Southampton University, 2002

Eric Marchioni, Higher Doctorate, (Doctorat de Diriger des Recherches), Faculty of Pharmacy, University of Strasbourg 2002

Zhixiong Shen, PhD, Department of Geography, University of Liverpool, 2006

PRESENTATIONS

Listed for the last 5 years with invited presentations indicated. Typically 4-5 invited talks per year have been delivered over the last 20 years.

24th November 2010, Methods for Irradiated Food Testing and Identification, Keynote talk, Food Irradiation Workshop, SIAL Exhibition, Abu Dhabi National Exhibition Centre, Invited by Abu Dhabi Food Control Authority

16th November 2010, OSL Dating and The Neolithic in Orkney, Invited talk to Neolithic Orkney 2000-2010 , St. Magnus Centre, Kirkwall; Historic Scotland sponsored review of the research agenda for the World Heritage Site, Heart of Neolithic Orkney.

28th October 2010, Uptake of the ERS format by EU Radiometrics teams, invited talk to Aero-Gamma Workshop, Hosted by Bundesamt für Strahlenschutz, Germany, in Berlin

8th September 2010, Dating exposed rock surfaces by luminescence : developing and testing models for surface bleaching rates, Presentation UK Luminescence Research Seminar, Oxford University

2nd September 2010, Opportunities and Challenges in Developing Multi-technique Chronologies for Human Evolution and dispersion, Invited talk to European Archaeology Association Meeting, The Hague

2nd July 2010, Luminescence dating of ceramics. Invited talk to Ceramic views of Scotland and Northern England from the Neolithic to the 20th century: issues of method, practice, and theory, Glasgow

18th May 2010, Development of Detection Methods for Irradiated Foods, Invited Institute of Physics Public Lecture, University of Surrey, Guildford

20th January 2010, OSL Dating of sedimentary sequences with environmental and archaeological associations, SAGES meeting Bridge of Allan.

3rd November 2009, OSL Dating of Tsunami Sediments : experience in Thailand from the December 2004 Indian Ocean event, Invited lecture, University of Hong Kong

23rd September 2009, Dating the Ring of Brodgar by OSL, Presentation to N. American Luminescence Research Meeting, University of Washington, Seattle, and to UK :Luminescence Meeting, Royal Holloway, University of London (7th September 2010).

10th September 2009, Scientific Studies of Ancient Glass, Invited lecture, Society of Technical Glass Workers Meeting, Glasgow

20th May 2009, Stato dell'arte e ricerche future nel campo dei metodi analitici per l'identificazione di alimenti irradiati, Invited lecture to Workshop on Food Irradiation, Organised by Istituto Zooprofilattico Sperimentale & Istituto Sanita Superiore, Foggia, Italy

21st September 2008, Using simple portable OSL measurements and laboratory characterisation to help understand complex sediment sequences for luminescence dating, Presentation to International Symposium on Luminescence and ESR dating, University of Beijing

13th March 2008, A Summary of outcomes of the FSA Proficiency Test development project and outline of new work in PSL., Invited presentation to Food Irradiation Stakeholders Group Meeting, Food Standards Agency, London

10th December 2007 , The capabilities of airborne and vehicular gamma ray surveys to detect illicit movement of radiological sources, Presentation to invitee-only Radiological detection Workshop, Royal Society, London.

11th October 2007, Environmental Radioactivity from the Air, Invited Inaugural lecture for the Merseyside Branch of the Institute of Physics Autumn Season, and opening lecture of the Liverpool International Science Festival, Department of Physics, University of Liverpool

13th September 2007, Can simple portable OSL measurements supplant laboratory profiling in characterising sedimentary sequences for dating? UK Specialist Seminar in Luminescence and ESR dating, University of Sheffield

5th September 2007, Optically Stimulated Luminescence characterisation of archaeosediments from Cava Petrilli, Tavoliere :- evaluation of field profiling using a portable OSL reader, presentation to International conference on Geoarchaeology, Salerno.

27th August 2007, New Platforms for Airborne Gamma Spectrometry, Invited presentation to Home Office/DEFRA expert panel meeting, UK CBRN Science and Technology Programme

20th June 2007, FSA PT project aims, structure and summary of outcomes, Presentation to hosted international meeting held in the Wolfson Medical Building, University of Glasgow, for participants in the FSA Proficiency Test Development Project.

22nd May 2007, Luminescence dating of tsunami sediments : residual signal levels in sediments deposited in Thailand from the 26th December 2004 Indian Ocean event. Paper : T43B-03, AGU Topical Meeting, Acapulco, Mexico.

18th April 2007, Development of a low level system for ³²Si dating, Invited talk to IBIS (UK Biogenic Silica working group) meeting, British Geological Survey, Keyworth.

17th April 2007, Radiometric Dating Using Si-32 – progress towards establishing a UK facility, NERC COGER Meeting Loughborough University

28th February 2007, Instrumentation at SUERC – diverse development and application routes. Presentation to PPARC Kite Club meeting with Dti Photonics Knowledge Transfer Network , Royal Observatory, Edinburgh

29th January 2007, Overview of CEN detection Methods, Invited talk to Food Standards Agency event for Public analysts and Health Food Producers, Aviation House, London

18th November 2006, Neanderthal Climate preferences & tolerances : results from dating research; Oral presentation of research project results, NERC Thematic Programme Final Event, Environmental factors in Human Evolution and Dispersion, British Museum, London

25th May 2006, Methods of Detecting Irradiated Foods, Invited talk to “Irradiation of Food Products – an update “, Chipping Camden Food Research Association.

19-20 September 2005, Luminescence dating of Middle Palaeolithic sites in Russia and Ukraine : Opportunities and Challenges, Invited Paper, and session chairman, Specialist workshop on palaeolithic chronology, Institute of Material Culture, Russian Academy of Science, St. Petersburg

28th July 2005, Luminescence residuals and the 26th December 2004 Indian Ocean Tsunami; experience from Thailand, Invited oral presentation (Authors : David Sanderson, Paul Bishop, Jim Hansom, Niran Chaimanee), 11th International Conference on Luminescence and Electron Spin Resonance Dating, University of Cologne.

28th July 2005, Luminescence dating of sediments from Angkor Borei, Lower Mekong Delta, Cambodia Oral presentation (Authors : David Sanderson, Paul Bishop, Miriam Stark, Dan Penny), 11th International Conference on Luminescence and Electron Spin Resonance Dating, University of Cologne.

19-20th July 2005, Training Course in Airborne Gamma Spectrometry and Flight Training for AWE and MOD, SUERC and the Solway.

3rd June 2005, Luminescence detection of Irradiated Foods, Presentation and demonstration workshop, Food Standards Agency UK, Aviation House London, during a training visit for Senior Food Authority representatives from Bulgaria, Romania and Turkey

19th April 2005 Luminescence dating of ceramics and sediments from Angkor Borei, Cambodia, Oral presentation, Archaeometrie 2005, INSTN Saclay, France.

10th January 2005, Experience of applying luminescence techniques to concrete damaged in the Storebaelt and Channel Tunnel Fires, International Workshop on Computer Modelling of Cementitious Materials, Department of Civil Engineering, University of Glasgow

19th January 2005, Developing Proficiency Testing Schemes for Detection of Irradiated Foods, Invited presentation to the Spice & Seasonings Association Technical Committee Meeting, London

11th March 2004, Luminescence Detection of Irradiated Food, Presentation to Technical Managers, Thai President Foods, Chonburi, Thailand.

24th March 2004, Application of Luminescence dating to Archaeological and Environmental Sciences, Department of Geography, University of Liverpool

14th May 2004, Luminescence dating of Aeolian sediments from coastal sites, invited paper, Historic Scotland Conference on Aeolian Archaeology, Longmore House, Edinburgh

8th September 2004, Luminescence dating of ceramics and sediments from Angkor Borei, Southern Cambodia, UK Luminescence Research Seminar, University of St.Andrews

21st September 2004, Rapid Mapping of Environmental Radionuclides using Airborne and Ground Based Radiometrics, Invited paper, European Commission Symposium on Off-site Nuclear Emergency Management, Rhodes

30th November 2004, Demonstrating the European Capability for airborne gamma spectrometry: Results from the ECCOMAGS Exercise, Invited Lecture, Department of Radiochemistry, University of Helsinki

30th November 2004, Luminescence dating of sediments, Invited lecture, Department of Radiochemistry, University of Helsinki

20-23rd January 2003, European Specialist Seminar and Workgroup Meeting on Environmental Radiometrics, Chinon, France, Convener, Session chairman, 3 oral presentations

9th April 2003, Presentations on “The ECCOMAGS-Resume2002 Exercise : Aims and tasks, Comparative AGS results, Ground based work and laboratory gamma spectrometry, and main findings”, NERC Coordinating Group on Environmental Radiation (COGER) meeting, University of Lancaster.

12th June 2003, Invited presentation on “A short investigation of the luminescence properties of talc” Food Standards Agency, Radiation Research Seminar, Aviation House, London.

26th August 2003, Chairman, International Steering Committee, ECCOMAGS Exercise review meeting, Bundesamt fur Strahlenschutz, Neuherberg, Germany

28th September 2003, “Demonstrating the European capability for airborne gamma spectrometry : results from the ECCOMAGS exercise” keynote oral presentation to EU sponsored meeting on “Off-site Nuclear Emergency Management – Capabilities and Challenges” Salzburg, Austria.

10th December 2003, Presentations of Results from the ECCOMAGS Exercise to UK Sponsors, Seminar Arranged by SNIFFER, Edinburgh

15th December 2003, Seminar on “Development and Application of Luminescence Dating to Archaeological and Environmental Sciences”, Department of Environmental and Biological Sciences, University of Stirling

PUBLICATIONS

I : Books

Sanderson D.C.W., McLeod J.J., 2000, Recent Applications and Developments in Mobile and Airborne Gamma Spectrometry, Edited Volume of Symposium Papers, ISBN 0 85261 685 6, University of Glasgow, Glasgow UK

Sanderson D.C.W., Cresswell A.J., Lang., J.J., 2003, An International Comparison of Airborne and Ground Based Gamma Ray Spectrometry : Results of the ECCOMAGS 2002 Exercise held 24th May to 4th June 2002, Dumfries and Galloway, Scotland, 387p, ISBN 0

85261 783 6, University of Glasgow, Glasgow

Burbidge C.I., Allsworth Jones P., Housley R.A., Sanderson D.C.W., Pyle D., Bazely O., McCave N., and van Andel T. (2005). Middle Palaeolithic sites in Russia and Ukraine: site summaries and fieldwork 2004. University of Glasgow, Glasgow. ISBN 0852618190.

II : Chapters in Books

Housley, R. A., van Andel, T. H. and Sanderson, D. C. W., 2006, A new research project to investigate the chronology connected with Neanderthal climate preferences and tolerances in the North-East Black Sea region, in: Anikovich, M. V., and Platonova, N.I. (Eds.), The Early Upper Paleolithic of Eurasia: General Trends, Local Developments
The problems of the early Upper Palaeolithic of the Kostenki-Boschevo region and adjacent territories, Nestor-History, Vol. 4, 26-38, St Petersburg: Russian Academy of Sciences (Ранняя пора верхнего палеолита Евразии: общее и локальное (материалы Международной конференции к 125-летию открытия палеолита в Костёнках, 23-26 августа 2006 г.). – Труды Костёнковско-Борщёвской археологической экспедиции ИИМК РАН. Вып. 4. – С.-Пб.: Нестор-История, 2006).

Sanderson D.C.W., Allyson J.D., Toivonen H., Honkamaa, T., 1997, Gamma Ray Spectrometry Results From Core Samples Collected For RESUME95, 11-39, In "RESUME95: Rapid Environmental Surveying Using Mobile Equipment, Copenhagen, NKS, ISBN 87-7893-014-6

Sanderson D.C.W. Allyson J.D., Mcconville P., Murphy, S., Smith J., 1997, Airborne Gamma Ray Measurements Conducted During An International Trial In Finland, (Short Form), 237-253, And Plates 19,20, In "RESUME95: Rapid Environmental Surveying Using Mobile Equipment, Copenhagen, NKS, ISBN 87-7893-014-6

Sanderson D.C.W., Carmichael L.A., Naylor J.D.,1996, Recent Advances In Thermoluminescence And Photostimulated Luminescence Detection Methods For Irradiated Foods, In "Detection Methods For Irradiated Food : Current Status" Ed. McMurray Et Al, 124-138, Royal Society Of Chemistry, Cambridge, ISBN 085 4047700

Sanderson D.C.W., Carmichael L.A., Spencer J.Q., Naylor J.D.,1996, Luminescence Detection Of Irradiated Shellfish, In "Detection Methods For Irradiated Food : Current Status" Ed. McMurray Et Al, 139-148, Royal Society Of Chemistry, Cambridge, ISBN 085 4047700

Sanderson, D.C.W, Allyson, J.D., Tyler A.N., 1995, Rapid Quantification And Mapping Of Radiometric Data For Anthropogenic And Technologically Enhanced Natural Nuclides, 197-216, In "Application Of Uranium Exploration Data And Techniques In Environmental Studies", International Atomic Energy Agency, Vienna, IAEA TECDOC 827

Sanderson, D.C.W., Allyson, J.D., Tyler, A.N., Scott, E.M., 1995, Environmental Applications Of Airborne Gamma Spectrometry, 71-92, In "Application Of Uranium Exploration Data And Techniques In Environmental Studies", International Atomic Energy Agency, Vienna, IAEA Tecdoc 827

Sanderson D.C.W., Scott E.M., Baxter M.S.,1990, The Use And Potential Of Aerial

Radiometrics For Monitoring Water Resource Contamination, In "Nuclear Contamination Of Water Resources, Thomas Telford, London, Pp 99-106

Sanderson D.C.W., Scott E.M., Baxter M.S.,1990b, Use Of Airborne Radiometric Measurements For Monitoring Environmental Radioactive Contamination, IAEA SM-306/138, 411-421, International Atomic Energy Agency, Vienna

Sanderson D.C.W.,1990, Luminescence Detection Of Irradiated Foods, In "Food Irradiation And The Chemist", Ed D.E. Johnston, M.H. Stevenson, Pp 25-56, Royal Society Of Chemistry, Cambridge.

III : Journal Papers

E. Munoz-Salinas, P. Bishop, D.Sanderson, Zamorano J., 2010, Interpreting luminescence data from a portable OSL reader : three case studies in fluvial settings, *Earth Surface Processes and Landforms*, MS ESP-10-0069-R1, 27p

David C.W. Sanderson, Simon Murphy, 2010, Using simple portable OSL measurements and laboratory characterisation to help understand complex and heterogeneous sediment sequences for luminescence dating, *Quaternary Geochronology*, 5, 299-305

A.D. Davies & D.C.W. Sanderson, 2009, Single grain OSL analysis: a discussion of how to clean discs, *Ancient TL* 27 (2), 47-50

Dominic A. Hodgson, Stephen J. Roberts, Michael J. Bentley, James A. Smith, Joanne S. Johnson, Elie Verleyen, Wim Vyverman, Andy J. Hodson, Melanie J. Leng, Andreas Cziferszky, Adrian J. Fox, David C.W. Sanderson,2009, Exploring former subglacial Hodgson Lake, Antarctica Paper I: site description, geomorphology and limnology, *Quaternary Science Reviews*, 28(23-24), 2295-2309

Dominic A. Hodgson, Stephen J. Roberts, Michael J. Bentley, James A. Smith, Joanne S. Johnson, Elie Verleyen, Wim Vyverman, Andy J. Hodson, Melanie J. Leng, Andreas Cziferszky, Adrian J. Fox, David C.W. Sanderson,2009,Exploring former subglacial Hodgson Lake, Antarctica. Paper II: palaeolimnology, *Quaternary Science Reviews*, 28(23-24), 2310-2325

A.J. Cresswell, D.C.W. Sanderson, 2009. The use of difference spectra with a filtered rolling average background in mobile gamma spectrometry measurements, *Nuclear Instruments and Methods in Physics Research A*, 607(3), 685-694

S.J. Roberts, D.A. Hodgson, M.J. Bentley, D.C.W. Sanderson, G. Milne, J.A. Smith, E. Verleyen, A. Balbo, 2009, Holocene relative sea-level change and deglaciation on Alexander Island, Antarctic Peninsula, from elevated lake deltas , *Geomorphology*, 112,122-134

James D. Hansom, David J.A. Evans, David C.W. Sanderson, Robert G. Bingham and Michael J. Bentley, 2008, Constraining the age and formation of stone runs in the Falkland Islands using Optically Stimulated Luminescence *Geomorphology*, 94, 117-130

D.C.W. Sanderson, A.J. Cresswell, D.C. White. 2007 The effect of flight line spacing on radioactivity inventory and spatial feature characteristics of airborne gamma-ray spectrometry data. *International Journal of Remote Sensing*, 1-16, DOI 10.1080/01431160701268970

Kinnaird, T., Sanderson D.C.W., Burbidge, C.I., Peltenburg, E., 2007, OSL dating of Neolithic Kissonerga-Mylouthkia, Cyprus, *Neolithics*, 2/07, 51-57

R.E. Jones, V. Kilikoglou, V. Olive, Y. Bassiakos, R. Ellam, I.S.J. Bray and D.C.W. Sanderson, 2007, A new protocol for the chemical characterisation of steatite "two case studies in Europe: the Shetland Islands and Crete, *Journal of Archaeological Science*, Volume 34, Issue 4, April 2007, Pages 626-641

Burbidge C.I., Sanderson D.C.W., Housley R.A., and Allsworth Jones P. 2007, Survey of Palaeolithic sites by luminescence profiling, a case study from Eastern Europe. *Quaternary Geochronology* 2(1-4),296-302

Sanderson D.C.W., Bishop P., Stark M., Alexander S., Penney D.,2007, Luminescence dating of canal sediments from Angkor Borei, Mekong Delta, Southern Cambodia *Quaternary Geochronology*, 2(1-4), 322-329

Reinhardt, L.J., Bishop., P., Hoey T.B., Dempster T.J., Sanderson D.C.W., 2007, Quantification of the transient response to base-level fall in a small mountain catchment: Sierra Nevada, Southern Spain, *Journal of Geophysical Research- Earth Surface*, 112, F03S05, doi:10.1029/2006JF000524.

A.A. Sommerville, J.D. Hansom, R.A. Housley and D.C.W. Sanderson, 2007, Optically Stimulated Luminescence (OSL) Dating Of Coastal Aeolian Sand Accumulation In Sanday, Orkney Islands, Scotland, *The Holocene*, Volume 17, (5),1-11

Bishop P., Sanderson D. Hansom J., Chaimanee, N., 2006, Age-dating of tsunami deposits: lessons from the 26th December 2004 tsunami in Thailand, *Geographical Journal*, Volume 171, 379-384

Stark M.S., Sanderson D.C.W., Bingham R.G., 2006, Monumentality in the Mekong Delta : Luminescence dating and Implications, *Indo-Pacific Prehistory Bulletin* 26, 110-120

Sanderson D.C.W, 2006, Thermoluminescence dating results, 117-122, ,in *Dundonald Castle Excavations 1986-1993*, Scottish Archaeological Journal, 26 (1-2),Edinburgh University Press, ISBN 0749624929

A.J. Cresswell, D.C.W. Sanderson, D.C. White. ¹³⁷Cs measurement uncertainties and detection limits for airborne gamma spectrometry (AGS) data analysed using a spectral windows method. *Applied Radiation and Isotopes* 64 (2006), 247-253

Deckers K., Sanderson, D.C.W, Spencer J.Q., 2005, Thermoluminescence screening of non-diagnostic sherds from stream sediments to obtain a preliminary alluvial chronology: An example from Cyprus , *Geoarchaeology*, 20(1), 67-77

Sanderson D.C.W., Cresswell A.J., Scott E.M., Lang J.J., 2004, Demonstrating the European Capability for Airborne Gamma Spectrometry : results from the ECCOMAGS Exercise, *Radiation Protection Dosimetry*, 109, (1-2), 119-125

Sanderson D.C.W., Cresswell A.J., Hardeman F., Debauche, A., 2004, An airborne gamma-ray spectrometry survey of nuclear sites in Belgium, *Journal of Environmental Radioactivity*, 74, 213-224

Bishop,P., Sanderson D.C.W., Stark M.T., 2004, OSL and radiocarbon dating of a pre-

Angkorian canal in the Mekong delta, southern Cambodia, *Journal of Archaeological Science* 31, 319-336.

Sanderson D.C.W., Bishop, P., Stark M.T., Spencer J.Q., 2003, Luminescence dating of Anthropogenically reset sediments from Angkor Borei, Mekong Delta, Cambodia, *Quaternary Science Reviews*, 22 (10-13), 1111-1122

Spencer, J.Q., Sanderson, D.C.W., Deckers, K., Sommerville, A.A., 2003, Assessing mixed dose distributions in young sediments identified using small aliquots and a simple two-step SAR procedure : the F-statistic and a diagnostic tool, *Radiation Measurements* 37, 425-431

Sommerville A.A., Hansom J.D., Sanderson D.C.W., Housley, R.A., 2003, Optically Stimulated Luminescence Dating of Large Storm Events in Northern Scotland, *Quaternary Science Reviews*, 22 (10-13), 1085-1092

Sanderson D.C.W., Carmichael L.A., Fisk S., 2003, Thermoluminescence Detection of Irradiated Fruits and Vegetables : An International Collaborative Trial, *JAOAC International* 85(6) 976-982

Sanderson D.C.W., Carmichael L.A., Fisk S., 2003, Thermoluminescence Detection of Irradiated Shellfish : An International Collaborative Trial *JAOAC International* 85(6) 971-975

Sanderson D.C.W., Carmichael L.A., Fisk S., 2003, Photostimulated Luminescence Detection of Irradiated Shellfish : An International Collaborative Trial , *JAOAC International* 85(6) 983-989

Sanderson D.C.W., Carmichael L.A., Fisk S., 2003, Photostimulated Luminescence Detection of Irradiated Herbs, Spices and Seasonings : An International Collaborative Trial *AOAC International* 85(6) 990-997

Bonsall, C., G. Cook, J. Manson & D. Sanderson., 2002, Direct dating of Neolithic pottery: progress and prospects. 8th Neolithic Studies. *Documenta Praehistorica* 29: 47–59.

Sanderson D.C.W. Scott E.M., 2001, Special Issue on Environmental Radiometrics, Editorial, *Journal of Environmental Radioactivity*, 53, 269-270

Sanderson D.C.W. McLeod, J.J., Ferguson J.M., 2001, A European Bibliography on airborne gamma-ray spectrometry, *Journal of Environmental Radioactivity*, 53, 411-422

Allyson J.D., Sanderson D.C.W., 2001, Spectral Deconvolution and operational use of stripping ratios in airborne radiometrics, *Journal of Environmental Radioactivity*, 53, 351-363

Sanderson D.C.W., Bishop P., Houston I., Boonsener M., 2001, Luminescence characterisation of quartz-rich cover sands from NE Thailand, *Quaternary Science Reviews* 20, 893-900

Anthony I.M.C., Sanderson D.C.W., Cook, G.T., Abernethy D., Housley R.A., 2001, Dating a burnt mound from Kilmartin, Argyll, Scotland, *Quaternary Science Reviews* 20, 921-925

Cresswell, A. J., Allyson, J. D. and Sanderson, D. C. W. 2001. A code to simulate nuclear reactor inventories and associated gamma-ray. *Journal of Environmental Radioactivity*, **53**, 399-409.

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GRANTS AND RESEARCH CONTRACTS

The following lists itemise more than £6.5M of external income comprising £4M in grants and contracts (subdivided into general topics, food irradiation and environmental radiometrics) plus

c£1.2M in service analyses and c£1.3M in instrument sales concerned with detection of irradiated foods.

General

1987-89	£40,000 from the Scottish Development Department to provide TL dating to Scottish Archaeology
1993	£115,000 from NEL to develop a multi-beam gamma density gauge for the UK national standard for multiphase flow
1995	£25,380 from Mott-MacDonald consulting engineers for luminescence testing of fire damaged concrete from the Storebaelt railway tunnel, Denmark.
1997	£51,016 from Mott-MacDonald & SETEC Geotechnique for luminescence analysis of fire damaged concrete from the channel tunnel.
1998	£5000 from Scott-Wilson Kirkpatrick for luminescence investigation of fire damaged concrete, Bilton Hall Bridge, Tyneside
1998	£10,000 from British Council for investigation of geochemical provenance studies of steatite (together with Dr. R.E. Jones, Dr. M. McCartney).
2001	£21,000 from Historic Scotland to support investigations of Burnt Mounds in Orkney and Shetland.
2001	£66,000 (together with Dr.M. Lee, GU) from EPSRC for investigation of luminescence properties of feldspars
2003	£185,000 (together with Dr. R. Housley GU, Professor N.Cave, Cambridge) from NERC for an investigation of the chronology of Neanderthal sites in the Caucasus.(NER/T/S/2002/00471)
2004-2007	£236,203 from NERC, Development of an ultra low-level system for analysis of ³² Si from environmental samples, (NE/B50606X/1) (DS as PI)
2005	20,000 Euro for analysis of fire damaged concrete from the Mont Blanc Tunnel, (Tunneliers), CETU, Lyon, France
2006	£22,500 from Saudi Aramco, Luminescence dating of sand dune and sabkha deposits from Saudi Arabia
2007	£18,000 from The University of Stirling for OSL dating of sediments from Geoarchaeological research projects in Sri Lanka and Greenland
2007	£7,500 from Thurso College, UHI, for OSL dating of coastal sediments from Caithness.
2008	£11,500 from Headland Archaeology for OSL dating of sediments from Newry, Northern Ireland.
2008	£8,500 from Roads Authority of Ireland for OSL dating of sediments from archaeological features at Lismullin.

Detection of Irradiated Food

1987-89	£103,000 from MAFF to investigate luminescence techniques for identifying irradiated foods (ref N384)
1990-92	£128,000 from MAFF for development of luminescence tests to identify irradiated fruits and vegetables (ref N1701)
1991	£14,800 from BCR (EC) for conducting an international interlaboratory study of luminescence identification of irradiated herbs and spices
1992-94	£117,000 from MAFF for development of luminescence tests to identify irradiated shellfish (ref N2635)
1994-96	£110,196 from MAFF for establishing luminescence detection methods for fruits and vegetables and shellfish, by means of international interlaboratory

	trials (ref 1B073)
1996-97	£40,578 from MAFF to extend international validation studies to the PSL method (ref 1B073)
1996	£51,477 from MAFF for Detection of irradiated food for a MAFF surveillance exercise (ref AN1132)
1997-98	£38,308 from MAFF for development of validated luminescence methods for detecting irradiated foods (ref FS1921).
1998	£27,092 from MAFF for a preliminary investigation of the impact of blending on luminescence detection of irradiated herbs and spices, ref CSA 4790
1999-2002	£158,894 from MAFF/Food Standards Agency for Investigation of statistical and imaging methods for luminescence detection of irradiated ingredients in blended foods, ref CSA 5240
2001-2002	£33,500 from the Food Standards Agency, for conducting analytical surveillance of unlabelled irradiated foods in the UK.
2003	£17500 from the Food Standards Agency to conduct a short investigation of the luminescence properties of talc
2004-2005	£15,000 from Herbalife for training in TL analysis using EN1788 methods
2004-2007	£154,157 from the Food Standards Agency – Development of Proficiency Testing for Detection of Irradiated Foods, ref E01068
2008	£51,000 from Food Standards Agency - Optimisation of Photostimulated luminescence methods for detecting irradiated dietary supplements
1995-2008	Routine applications of EN1788 and EN13751 analyses for diverse Food Enforcement Agencies, Retail and Supply sectors (>12,000 analyses at £100-200 per sample; total revenue c. £1.2M)
1995-2009	Supply of PSL instruments and training (for EN13751 analysis) to >180 laboratories worldwide (unit value £13,500; total revenue c. £2M).

Airborne and Environmental Gamma Ray Spectrometry

1988	£38,700 from MAFF to undertake an aerial radiation survey (post- Chernobyl) of West Cumbria. (With Dr. E.M. Scott)
1989-90	£30,000 from Skyline Films, HTV, BP Oil, for miscellaneous aerial surveys of environmental radioactivity
1989-90	£50,000 from the Leukaemia Research Fund to conduct a pilot study of the influence of variations in natural radioactivity on leukaemia epidemiology (with Dr. E.M. Scott, Prof. M.S. Baxter)
1990	£50,000 from Ayrshire Local Authorities to conduct baseline aerial radiometric surveys
1990-91	£35,000 from BNFL to develop aerial radiometric emergency response plans for nuclear sites, and conduct detailed baseline environmental survey of Sellafield.
1991	£47,000 from AWS and SHELL for location of a stolen 137-Cs source in the Niger Delta by aerial radiometrics.
1992-93	£90,000 from BNFL to maintain aerial radiometric emergency response plans for nuclear sites, and conduct detailed baseline environmental surveys of Chapelcross, the Inner Solway, Springfields and the Ribble Estuary.
1993	£95,200 from the Scottish Office Environment Department for a radiometric survey of SW Scotland.
1994	£76,375 from Scottish Nuclear to conduct radiometric surveys of Hunterston and Torness nuclear power stations (Ref 79C/0000/006478)

1995	£52,875 from BNFL for participation in RESUME95 and maintenance of radiometric facilities
1995	DK50,000 from NKS for preparation of a calibration site for the RESUME95 international intercomparison study in Finland
1995-1997	£66,416 from DoE and MAFF for characterisation of the response of airborne gamma ray spectrometers to nuclear accident fission product releases (refs DoE RW/8/6/72, MAFF RP0237)
1996-1999	100,000 ECU from the European Commission Framework IV Nuclear Fission safety programme, for European Coordination of Environmental Airborne Gamma Ray Spectrometry.
1996	£52785 from MOD for conducting an airborne gamma ray survey of the Clyde submarine base, and maintenance of AGS capability
1996	£8,500 from MOD for participation in Exercise Senator, May 1996. (SMC11BR/3097)
1996	£82,500 from Newbury District Council for conducting airborne and ground based environmental radioactivity surveys of Greenham Common and Newbury District.
1996	£47,000 from Magnox Electric for conducting an airborne gamma ray survey of the Sizewell nuclear power station. (ref BL/G/43218/E)
1996	£6,000 from DRA for assistance with a design specification of an AGS system suitable for use with search and rescue helicopters.
1998-1999	£45,277 from EPSRC for investigation of improved NaI(Tl) and CsI(Tl) detector arrays for environmental airborne gamma spectrometry (GR/K83830 with Professor R. Owens, GU and colleagues).
1997	£3,500 from MOD for participating in Exercise Senator 97
1997-8	£36,000 from the Vale of White Horse District Council, UKAEA and RAL for an investigation of off-site radiation levels at Harwell and the Rutherford-Appleton Laboratory
1999-2001	£296,000 from DETR, SEPA, MAFF, EA, BNFL and IMC, to investigate Spatial and Temporal Aspects of Airborne Gamma Spectrometry
2000	£45,000 from SCK-CEN and IRE to conduct airborne surveys of the nuclear sites at Mol and Fleurus, Belgium
2000-2003	650,000 EURO from EC to coordinate a thematic infrastructure network on airborne gamma spectrometry in support for nuclear emergency response (Project ECCOMAGS)
2001	14000 Euros for participation in the SAMEN Cluster project
2001	£66000 from the Food Standards Agency (Scotland) for Upgrading of Radiometric Equipment.
a.	£130,000 from SNIFFER :- UK support to the ECCOMAGS exercise
2004	£15,700 from DEFRA – Desktop study of the use of police helicopters for airborne gamma spectrometry
2005-6	£250,000 from Qinetiq :- provision of an AGS spectrometer and training for use by MOD and The Home Office
2006	£17,500 from DERC :- contribution to costs of AGS survey of Caithness,

November 2006.

- 2009 £55,531 from the Home Office, Demonstration of Airborne Gamma Ray Spectrometry in preparation for urban surveys,
- 2010 £25,000 from Sellafield Sites, Modelling Gamma Spectrometry Systems for use in Beach Monitoring near Sellafield.
- 2010 £25000 from Home Office, Appraisal of Denham and Sandridge Site for Radiological Survey Calibration Facilities, and Establishing CAA Approvals to Operate SUERC Airborne Gamma Spectrometry Equipment with PremiAir Air Services, Denham.

