

## *Curriculum Vitae*

Alastair Ruffell B.Sc (HONS) Ph.D, FGS

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Nationality – British

### **Overview**

- Five current research council grants, totalling over £500,000.
- Top score (4\*) for my Geoforensics Impact Statement in UK Government Research Excellence Framework (2014).
- Total (including collaborative) grant earnings exceed £9 million over 25 years.
- Published 130 peer-reviewed papers and one book.
- Completed over 140 major (over £1000) consultancy projects, mainly on Geoforensics.
- Health & Safety Coordinator; formerly Director of Education.
- Teaching includes geology, geomorphology, GIS, climate change, field classes throughout the UK, Ireland, Mediterranean, Geoforensics, Masters level geophysics. Class sizes up to 160.
- Training Officer & committee member for the IUGS Initiative on Forensic Geology.
- Chair, Forensic Geoscience Group of the Geological Society of London.

**Statistics** (from researchgate.edu) Score–36.88; Impact Points–236.34; Citations–2430

### **Grants**

1. Remote sensing and geophysics for archaeology (€2.6 million European Research Council FRAGSUS grant: PI Professor Malone, 10% to Ruffell)
2. TellusBorder peat depth monitoring for carbon stocks (£4.5 million INTERREG [EU] with £72,000 to Ruffell & colleagues).
3. TellusBorder remote sensing of illegally buried waste (£72,000 to Ruffell & colleagues).
4. Volcanology/glaciology (£47,000 EPSRC Ph.D studentship: PI Ruffell).
5. Artefact analysis (€90,000 Marie Curie Fellowship: Linda Bouteille, 33% to Ruffell).
6. Quantifying the impact of wildfires in N.Ireland N.Ireland (£125,000, jointly to School of Biology and GAP, both QUB). Environment Agency, National Museums of N.Ireland and CEDaR funding. CI to Ruth Kelly.

### **Interests**

- Using non-destructive geological techniques in landscape and material analysis for forensic, archaeological, geological and geomorphological research.
- Forensic research. Multiproxy methods (remote sensing, geophysics, landscape interpretation) for the search of buried and sunk items. Trace evidence analysis methods for criminal investigations.
- Consultancy for engineering companies, the police and environment agencies and the Independent Commission for the Recovery of Victims Remains.

### **Details**

Pure research centres on the non-destructive assessment of geological materials for: underwater imaging (Knowledge Transfer Partnership [KTP] grant with Collins Engineering, 2009–2013, £84,000); assessment of weathered historic structures (KTP grant, 2007–2012, £72,000); limits and possibilities of ground-penetrating radar (ERC grant 1 [above]); geomorphology (EPSRC studentship, grant 4 [above]).

Applied research is consultancy-driven for criminal (70 cases), environmental (21 cases), geotechnical and military (33 cases) humanitarian (3 cases) and historical/archaeological (5 cases) purposes: details available on request.

Much of my research explores integrating remotely-sensed geochemical data, geomorphology, geophysics with other methods (soil chemistry, water stable isotopes, cadaver dogs) to improve search and recovery of illicit materials, especially homicide graves and polluted ground.

I work on the development of improved strategies for sampling and non-destructive analysis of trace evidence and archaeological materials.

Organised five international conferences, chair of Geological Society forensic group, International Union of Geological Sciences funded initiative member, non-US adviser on government-funded SWGGEO (Scientific Working Group).

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I am integrating aerial and satellite imagery with ground-based geophysics for research into illegal landfill sites (TELLUSBorder INTERREG Grant 3 [above]); glaciology (EPSRC studentship grant 4) and research with NERC-funded fellow Stephen Livingstone (Sheffield) on Canadian sub-glacial lakes.

Using clay mineral stratigraphy, sedimentology, palaeoecology and stable isotope analysis to understand past environmental change. Collaborative with NERC-funded project headed by Darren Grocke (Durham).

### **Other Information**

- Editor of Geological Journal, Cretaceous Research, Irish Journal Earth Sciences.
- External Examiner at Aberystwyth, UCL (London), Keele, Oxford (Hertford College), Liverpool, Mons (Belgium), Lille, Paris IV (France), University of Southern Cape.
- BP-funded post-doctoral research (Imperial College), 1989-1990; NERC-funded Ph.D (Birmingham), 1986-1989, graduated 1990; oil industry (1985-1986). B.Sc in Geology (University College, London) 1982-1985, graduated 1985. First Class Honours. Full, clean driver's licence including minibuses and trailer-towing. I am physically fit and have outdoor survival skills and Emergency First Aid certification (2015).
  - Supervised successful government, EU and oil industry funded PhD students: Janka Nitschka (2014); Suzanne Beech (2012); Suresh Rohilla (2011); HongLi Zou (2011); Rebecca Enlander (2010); Antoinette Keaney (2009); Robert Shelton (1998); Gail Marshall (2000); Jennifer McKinley (2001); Emma Heasley (1998); Stephen Barnes (1996); Marie McSherry (1995); Richard Evans (1996).

### **Referees**

Available on request

*A. Ruffell*

21-6-16

Peer -reviewed Articles

130. Ruffell, A. & McKinley, J.M. 2016. Spatial distribution of soil geochemistry in geoforensics. In: Young, M.E. & Donald, A. The Tellus Project. Royal Irish Academy Special Publication, 417-425.
129. Livingstone, S.J., Utting, D., Ruffell, A., Clark, C.D., Pawly, S., Atkinson, N. & Fowler, A.C. 2016. Discovery of relict subglacial lakes: their geometry and mechanism of drainage. *Nature Communications*, **445**, in press.
128. Ruffell, A. 2016. Do spectral gamma ray data really reflect humid-arid palaeoclimates? A test from the Palaeogene Interbasaltic weathered horizons at the Giant's Causeway, N.Ireland. *Proceedings of the Geologists, Association*, **127**, 18-28.
127. Lynch, C.M., Barr, I.D., Mullan, D. & Ruffell, A. 2016. Rapid glacial retreat on the Kamchatka Peninsula during the early 21<sup>st</sup> Century. *The Cryosphere, Discuss*, doi:10.5194/tc-2016-42, 2016.
126. Ruffell, A., Simms, M.J. & Wignall, P.B. 2015. The Carnian Humid Episode of the late Triassic. *Geological Magazine*, **153**, 271-284.
125. Ghasemi-Nejad, E., Ruffell, A., Rahimpour-Bonab, H., Sharifi, M., Sotani, B. & Sfidari, E. 2015. Spectral gamma-ray logs and palaeoclimate change? Permian – Triassic, Persian Gulf. *Geological Journal*, **49**, 215-225. DOI: 10.1002/gj.2552.
124. Ruffell, A. & McAllister, S. 2014. A RAG system for forensic and archaeological searches of burial grounds. *International Journal of Archaeology*, **3**, 1-8. DOI: 10.11648/j.ija.s.20150301.11
123. Ruffell, A. 2014. Lacustrine flow (divers, side-scan sonar, hydrogeology, water penetrating radar) used to understand the location of a submerged human body. *Journal of Hydrology*, **513**, 164-168. <http://dx.doi.org/10.1016/j.jhydrol.2014.03.041>
122. Ruffell, A., Pringle, J.K. & Forbes, S. 2014. Search protocols for hidden forensic objects beneath floors and within walls. *Forensic Science International*, **237**, 137-145. doi.org/10.1016/j.forsciint.2013.12.036
121. Ruffell, A. & McKinley, J. 2014. Forensic geomorphology. *Geomorphology*, **206**, 14-22. doi.org/10.1016/j.geomorph.2013.12.020
120. Keaney, A, McKinley, J., Ruffell, A., Graham, C. & Robinson, M. 2013. Spatial statistics to estimate peat thickness using airborne radiometric data. *Spatial Statistics*, **5**, 3-24.
119. Pirrie, D., Ruffell, A. & Dawson, L. (eds.). 2013. *Environmental and Criminal Geoforensics*. Geological Society of London, Special Publication, **384**, 312pp.
118. Ruffell, A. 2013. Solid and drift geology in forensic investigations. In: Pirrie, D. et al., (ed.) *Environmental and Criminal Geoforensics*. Geological Society Special Publication, **384**, 163-172. <http://dx.doi.org/10.114/SP384.15>
117. Ruffell, Pirrie, D. & Power, M. 2013. Issues and opportunities in urban forensic geology. In: Pirrie, D. et al., (ed.) *Environmental and Criminal Geoforensics*. Geological Society Special Publication, **384**, 147-161. <http://dx.doi.org/10.114/SP384.19>
116. McKinley, J.M., Ruffell, A. and Worden, R.H. 2013. An integrated stratigraphic, petrophysical, geochemical and geostatistical approach to the understanding of burial diagenesis: Triassic Sherwood Sandstone Group, South Yorkshire, UK. In: Morad, S., Ketzer, M. and de Ros, L. (eds), *Linking Diagenesis to Sequence Stratigraphy*. Special Publication of the International Association of Sedimentologists, No. 45, 231-256.

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115. Pirrie, D. & Ruffell, A. 2012. Soils and geological trace evidence. In: *Forensic Ecology Handbook: From Crime Scene to Court*. Eds: Marquez-Grant, M. & Roberts, J. Wiley-Blackwell, Chichester. pp.183-201.
114. Donnelly, C., Ruffell, A., O'Neill, J., McSparron, C. & McHugh, R. 2012. Investigations at Bruce's Castle. In: Chapter 3 – Archaeology & History, *Rathlin Island, An Archaeological Survey of a Maritime Landscape*. Editors: Forsythe, W & McConkey, R. pp.159-177.
113. Pringle, J.K., Ruffell, A. Jervis, J.R., Donnelly, L.J., McKinley, J.M., Hansen, J., Morgan, R., Pirrie, D. & Harrison, M. 2012. The use of geoscience methods for terrestrial forensic searches. *Earth Science Reviews*, **112**, 250-260.
112. Ruffell, A. 2012. Forensic Geoscience. In: *Encyclopedia of Forensic Sciences* (Edition 2). Editors: Siegel, J.A & Saukko, P. Elsevier. Chapter 114. pp.114-118.
111. Hounslow, M.W., McKie, T. & Ruffell, A.H. 2012. Permian to late Triassic post-orogenic collapse and rifting, arid deserts, evaporating seas and mass extinctions (Chapter 16). In: Woodcock, N. & Strachan, R. (eds.) *Geological History of Britain & Ireland*, 2<sup>nd</sup> Edition. Wiley Blackwell Science. pp. 315-340.
110. Ruffell, A., Brooks, W.E. & Majury, N. 2011. Geological fakes and frauds. *Earth Science Reviews*, **111**, 224-231.
109. McKinley, J.M., Atkinson, P., Lloyd, C.D., Ruffell, A. & Worden, R. 2011. How porosity and permeability vary spatially with grain size, sorting, cement volume and mineral dissolution in fluvial Triassic Sandstones and the value of geostatistics and local regression. *Journal of Sedimentary Research*, **81**, 844-858.
108. Ruffell, A. & Murphy, E. 2011. An apparently jawless cadaver: a case of post-mortem slippage. *Science & Justice*, **51**, 150-163.
107. Ruffell, A. & Sandiford, A. 2011. Maximising Trace Soil Evidence: An Improved Recovery Method Developed During Investigation of a \$26million Bank Robbery. *Forensic Science International*, **203**, 1-7.
106. Ruffell, A. 2010. Forensic Pedology, Forensic Geology, Forensic Geoscience, Geoforensics and Soil Forensics. *Forensic Science International*, **202**, 9-12.
105. Ghasemi-Nejad, E., Poureslami Ardakani, E. & Ruffell, A. 2010. Palaeoclimate change recorded in Upper Cretaceous (Albian – Cenomanian) Kazhdumi Formation Borehole spectral gamma-ray logs, South Pars Gas Field, Persian Gulf. *Palaeogeography, Palaeoclimatology, Palaeoecology*, **289**, 208-214.
104. Parker, R., Ruffell, A. & Hughes, D. 2010. Geophysics and the search of freshwater bodies: a review. *Science & Justice*, **50**, 141-149.
103. Ruffell, A. & Dawson, L. 2009. Forensic geology in environmental crime: illegal waste movement and burial in N.Ireland. *Environmental Forensics*, **10**, 207-217.
102. Swindles, G.T. & Ruffell, A. 2009. A preliminary investigation into the use of testate amoebae for the discrimination of soil samples. *Science & Justice*, **49**, 182-190.
101. Ruffell, A., McCabe, A., Donnelly, C. & Sloan, B. 2009. Location and assessment of an historic (15-60 years old) mass grave using geographic and ground-penetrating radar investigation, NW Ireland. *Journal of Forensic Sciences*, **54**, 15-26.

100. Ruffell, A. & Kulesa, B. 2009. Applications of Geophysical Techniques in Identifying Illegally-buried Toxic Waste. *Environmental Forensics*, **10**, 196-207.
99. Ruffell, A., Donnelly, C.J., Carver, N., Murphy, E., Murray, E. & McCambridge, J. 2008. Suspect burial excavation procedure: a cautionary tale. *Forensic Science International*, **183**, 11-16.
98. McKinley, J., Ruffell, A., Harrison, M., Meier-Augenstein, W., Kemp, H., Graham, C. & Barry, L. 2009. The importance of spatial thinking in search methodology: case study no body murder enquiry, West of Ireland. In: Ritz, K., Dawson, L. & Miller, D. *International Soil Forensics*, Elsevier International. p.285-302.
97. Keaney, A., Ruffell, A. & McKinley, J. 2009. Geological trace evidence: forensic and legal perspectives. In: Ritz, K., Dawson, L. & Miller, D. *International Soil Forensics*, Elsevier International. p.221-237.
96. Ruffell, A. & McKinley, J. 2008. *Geoforensics*. Wiley Interscience, London & New York. 352pp. ISBN-10: 0470057343 ISBN-13: 978-0470057346.
95. Lazo, D., Aguirre-Urreta, M., Price, G.D., Rawson, P.F. & Ruffell, A.H. 2008. Palaeosalinity variations in the Early Cretaceous of the Neuquen Basin, Argentina: evidence from oxygen isotopes and palaeoecological analysis. *Palaeoecology, Palaeogeography, Palaeoclimatology*, **260**, 477-493.
94. Aguirre-Urreta, M.B., Price, G.D., Ruffell, A.H. Darío G. Lazo, D.G., Kalin, R.M., Ogle, N.M & Rawson, P.F. 2007. Southern Hemisphere Early Cretaceous (Valanginian-Early Barremian) carbon and oxygen isotope curves from the Neuquén Basin, Argentina. *Cretaceous Research*, **29**, 87-99
93. McKinley, J. & Ruffell, A. 2007. Contemporaneous spatial sampling at a scene of crime: advantages and disadvantages. *Forensic Science International*, **172**, 196-202.
92. Ruffell, A. 2006. Under-water Scene Investigation using Ground Penetrating Radar (GPR) in the Search for a Sunken Jet ski, Northern Ireland. *Science & Justice*, **46**, 150-159. doi:10.1016/S1355-0306(06)71602-1
91. Farmer, N.L., Ruffell, A., Meier-Augenstein, W., Meneely, J. & Kalin, R.M. 2006. Forensic analysis of wooden safety matches. *Science & Justice*, **46**, 145-155.
90. McKinley, J.M., Warke, P.A., Lloyd, C.D., Ruffell, A.H. and Smith, B.J., 2006. Geostatistical analysis in weathering studies: case study of Stanton Moor building sandstone. *Earth Surface Processes and Landforms*, **31**, 950-969.
89. Schnyder, J., Ruffell, A., Baudin, F. & Deconinck, J-F. 2006. Conjunctive use of clay mineralogy and spectral gamma-ray logs in defining late Jurassic – early Cretaceous palaeoclimate change. *Palaeoecology, Palaeogeography, Palaeoclimatology*, **229**, 303-320.
88. Ruffell, A.H., Holliday, D.H.W. & Smith, D.B. 2006. Permian: arid basins and hypersaline seas In: *The Geology of England & Wales*, 2<sup>nd</sup> Edition. Editors: Brenchley, P.J. & Rawson, P.F. Geological Society, London, 124, 269-294.
87. Hounslow, M. & Ruffell, A. 2006. Triassic: seasonal, rivers, dusty deserts and saline lakes. In: *The Geology of England & Wales*, 2<sup>nd</sup> Edition. Editors: Brenchley, P.J. & Rawson, P.F. Geological Society, London, 124, 295-325.
86. Grocke, D., Price, G.D., Ruffell, A., Mutterlose, J. & Baraboshkin, E. 2005. The Valanginian (Early Cretaceous) positive carbon-isotope event recorded in terrestrial plants. *Earth & Planetary Science Letters*, **240**, 495-509.
85. Ruffell, A. 2005. Searching for the I.R.A. Disappeared: ground-penetrating radar investigation of a churchyard burial site, Northern Ireland. *Journal of Forensic Sciences*. **50**, 414-424.

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84. Ruffell, A, McKinley, JM, Lloyd, CD & Graham, C. 2005. Th/K and Th/U ratio mapping of spectral gamma ray data improves spatial resolution of shoreline structures. *Journal of Environmental Geophysics*, **14**, 56-60.
83. Ruffell, A. 2005. Burial Location Using Cheap and Reliable Quantitative Probe Measurements. Diversity in Forensic Anthropology, Special Publication of Forensic Science International. *Forensic Science International*, **151**, 207-211.
82. Ruffell, A. & McKinley, J. 2005. Forensic Geology & Geoscience. *Earth Science Reviews*. **69**, 235-247.
81. Kessels, K., Mutterlose, J. & Ruffell, A. 2004. Calcareous nanofossils from late Jurassic sediments of the Volga Basin (Russian Platform): evidence for productivity-controlled black shale deposition. *International Journal of Earth Sciences*, **92**, 743-757.
80. Ruffell, A., Geraghty, L., Brown, C. & Barton, K. 2004. Ground-penetrating radar facies as an aid to sequence stratigraphic analysis: application to the Archaeology of Clonmacnoise Castle, Ireland. *Archaeological Prospection*, **11**, 1-16.
79. McKinley, J.M., Lloyd, C., Ruffell, A. 2004. Variogram analysis of permeability data from reservoir sandstones. *Mathematical Geology*, **36**, 7-17.
78. Ruffell, A & Wiltshire, P. 2004. Conjunctive use of quantitative and qualitative X-ray diffraction analysis of soils and rocks for forensic analysis. *Forensic Science International*, **145**, 13-23.
77. McCarty, D.K., Drits, V., Sakharov, B., Zviagina, B.B., Ruffell, A. & Wach, G.D. 2004. Heterogenous mixed-layer clays from a Cretaceous transgressive siliciclastic succession, Isle of Wight (Southern England). *Clays & Clay Minerals*, **52**, 552-575.
76. Marshall-Neill, G. & Ruffell, A. 2004. Authigenic phosphate nodules (Late Cretaceous, Northern Ireland) as condensed succession microarchives. *Cretaceous Research*, **25**, 439-452.
75. Ruffell, A., Evans, R. & McKinley, J.M. 2004. Distinguishing faults from flooding surfaces on spectral gamma-ray logs. *American Association of Petroleum Geologists*, **88**, 1239-1254.
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73. McArthur, J. Price, G.D., Mutterlose, J. & Ruffell, A. 2004. Kinetic fractionation of stable isotopes in belemnite rostra. *Palaeoecology, Palaeogeography, Palaeoclimatology*, **202**, 253-272.
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71. Kullessa, B., Ruffell, A. & Glynn, D. 2003. Geophysical investigation of abandoned salt mine hazards. *Journal of Environmental Geophysics*, **14**, 21-24.
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69. Mutterlose, J., Bornemann, A., Luppold, F.W., Owen, H.G, Ruffell, A., Weiss, W. & Wray, D. 2003. The Vöhrum section (northwest Germany) and the Aptian/Albian boundary. *Cretaceous Research*, **24**, 203-252.

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68. Barnes, S., Parnell, J., Ruffell, A.H. & Kalin, R. 2003. Groundwater circulation patterns and isotope geochemistry in the Chalk of Northern Ireland. *Journal of Engineering Geology*, **36**, 59-73.
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65. Ruffell, A.H., Hesselbo, S.P., Wach, G.D., Simpson, M.I. & Wray, D.S. 2002. Fuller's earth (bentonite) in the Lower Cretaceous (Upper Aptian) of Shanklin (Isle of Wight, southern England). *Proceedings of the Geologists' Association*, **113**, 1-10.
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