

<b>Institution:</b>	University of Northumbria at Newcastle
<b>Unit of Assessment:</b>	34 - Art and Design: History, Practice and Theory
<b>Title of case study:</b> Ensuring Modern Art is Seen as Modern Artists Intended	
<b>1. Summary of the impact</b>	
<p>Research led by Dr Brian Singer on techniques for analysing artists' materials has helped museum and gallery conservators develop treatments through a sound knowledge of the materials present. Publications by conservators (2008-11) reference the research and, in relation to high-profile works by Munch, cite changes in practice that have enhanced the continuing availability of this artist's oeuvre. The same research has supported the estate of Francis Bacon, assisting its authentication committee to define authenticity and date of unattributed works for inclusion in Bacon's catalogue raisonné. Singer's research and methods have ultimately benefited the wider public, ensuring engagement with 20th Century art in the long term.</p>	
<b>2. Underpinning research</b>	
<p>The underpinning research defines novel methodology which can be used to identify vital components of artists' materials through the use of microsamples ethically removed from the unseen margins of works or from damaged areas prior to restoration.</p> <p>During the period 2005-2006, Dr Brian Singer (Senior Lecturer, Northumbria University, 1990-2012) developed a very sensitive method for analysing proteinaceous paint binders, which simultaneously gave information on oils or resins present (Singer and McGuigan 2007). This method, which yielded results on microscopic samples, was initially disseminated in the Conservation Science workshop in Thessalonica and published in <i>Annali di Chimica</i>. The method was used extensively to reveal the nature of the <i>binders</i> in works by Edvard Munch on paper and in sketches on canvas (Singer et al 2010). The method has also proven its worth in analysing paints from objects as diverse as paintings, polychrome sculpture and archaeological finds, including to aid authentication of a painting attributed to Jean-Édouard Vuillard.</p> <p>In parallel, research was carried out by Singer, in collaboration with conservators in the Munch Museum, Oslo and the National Museum of Art, Architecture and Design in Oslo <i>on the materials present</i> in a number of works by Edvard Munch (Singer et al 2010). Singer provided all the scientific analysis, which used a synthesis of established methods and new methods to aid the research of art historians and conservators. This research addressed ethical issues about whether to clean areas of one painting where the staining (bird excrement) was present as part of Munch's intention for the appearance of the work.</p> <p>During this period, Singer led a multidisciplinary team, consisting of chemists and conservation scientists, developing novel analytical techniques for the study of both traditional pigments and the twentieth century organic pigments which largely replaced them. Since Dr Singer's retirement (2012) this has been continued by Dr Justin Perry (Lecturer 2000-2005, Senior Lecturer 2005-2009, Enterprise Fellow 2009 to date, Northumbria University). The team's method for analysing yellow lake pigments by liquid chromatography-mass spectrometry (LC-MS) (Perry et al. 2011) was novel, especially with regard to its ease of use where the use of hazardous reagents is replaced. This method uses liquid chromatography mass spectrometry and enables the identification of the plant of origin of a dye. The work was carried out between 2007 and 2011 and has been used in the analysis of works by Munch and Jean-Baptiste Oudry (in collaboration with the Getty Conservation Institute) and materials from J M W Turner's paintbox.</p> <p>The team has most recently devised a method of analysing modern pigments by pyrolysis-GCMS (Russell <i>et al</i>, 2011). It enabled the detection and identification of several of a wide range of pigments and as such offered a step change in the utility of this methodology. The method immediately found use in ongoing research into the materials of Francis Bacon, funded by his</p>	

estate, involving extensive sampling of his paintings and studio materials and the development of a database of his materials.

### 3. References to the research

Singer B. and McGuigan R. (2007) 'The Simultaneous Analysis Of Proteins, Lipids, and Diterpenoid Resins Found In Cultural Objects', *Annali di Chimica*, 97, pp405-416. DOI: 10.1002/adich.200790044

Singer B., Aslaksby T., Topalova-Casadiago B. and Storevik Tveit E. (2010) 'Investigation of Materials used by Edvard Munch' (2010), *Studies in Conservation*, 55(4), pp274-292. Available at: <http://www.ingentaconnect.com/content/maney/sic/2010/00000055/00000004/art00008>. Available from Northumbria University on request.

Perry J. J., Brown L., Jurneczko E., Ludkin E. and Singer B. W. (2011) 'Identifying the plant origin of Artists' yellow "lake" pigments by electrospray mass spectrometry', *Archaeometry*, 53(1), pp164-177. DOI: 10.1111/j.1475-4754.2010.00530.x. Available at: <http://onlinelibrary.wiley.com/doi/10.1111/j.1475-4754.2010.00530.x/full>

*NB: The following three papers were funded by an initial grant of over £73,000 from the Estate of Francis Bacon, continuing with a further grant of £12,000.*

Russell J. E., Singer B., Perry J. J. and Bacon A. (2011) 'The identification of synthetic organic pigments in modern paints and modern paintings using pyrolysis-gas chromatography-mass spectrometry', *Analytical and Bioanalytical Chemistry* 400(5), pp1473-1491. DOI: 10.1007/s00216-011-4822-9/. Available at: <http://link.springer.com/article/10.1007/s00216-011-4822-9/fulltext.html>

Russell J. E., Singer B. W., Perry J. J. and Bacon A. (2012) 'Investigation of the materials found in the studio of Francis Bacon (1909-1992)', *Studies in Conservation*. (ISSN: 00393630) 57(4), pp195-206. DOI: 10.1179/2047058412Y.0000000008.

Russell J. E., Singer B. W., Perry J. J. and Bacon A. (2012) 'The materials and techniques used in the paintings of Francis Bacon (1909-1992)' (2012), *Studies in Conservation*. (ISSN: 00393630) 57(4), pp207-217. DOI: 10.1179/2047058412Y.0000000009.

### 4. Details of the impact

The application and use of the methods developed in Singer's group are having an impact on the way in which conservators of fine art and museum objects can identify materials, authenticate works of art and develop sensitive and appropriate conservation treatments.

#### Edvard Munch

The conservation treatments for some of Munch's best known works, including two versions of 'The Scream' (1893, the other is thought to be from 1910) 'Madonna' (1894) and other works, are based on the findings of Singer's research. Singer worked directly with the Munch Museum, Oslo and his research influenced the choice of conservation treatments and enabled conservators to preserve these important works for public display. Publicly available evidence for the impact of this work is in a string of publications by the conservators regarding treatments with references to the analytical results (see sources 1-5).

#### Jean-Baptiste Oudry

The method for analysing yellow lake pigments by LC-MS (Perry et al 2011) was used in the analysis of some organic lake pigments used by Jean-Baptiste Oudry since the receipt of samples in 2008. The work on the materials Oudry used in his painting 'Reclining Tiger' was carried out for the Getty Conservation Institute in Los Angeles and the knowledge transferred directly to them. They acknowledge the results from the Northumbria team in their ongoing publicity regarding the conservation of Oudry's Menagerie paintings (from 2008 onwards) as these results had an impact

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on the way in which the painting has been conserved.

Francis Bacon

Singer's research into Bacon's materials has assisted the authentication committee of the estate of Francis Bacon to make decisions regarding the authenticity of some work attributed to him, as well as assisting conservators in designing treatments for his work. Evidence for this is written in reports on the analytical findings of paintings: this was communicated with the authentication committee.

The research team at Northumbria is conducting ongoing investigation of many examples of controversial material such as collections of works on paper and pictures in the Barry Joule collection at the Tate and those works allegedly produced while Bacon visited relatives in South Africa. One of these works has recently been re-assessed and authenticated as an abandoned work by Bacon (in 2011) as a result of the research.

Dr Singer's team also provided expert analysis to Bacon's Estate and the German Police to determine the origin of a series of pencil sketches which have been controversially attributed to Bacon (2011 to present). The research is having a key impact on the number of works that can be attributed to Bacon and in turn, the value of those works and Bacon's historical legacy.

The methods developed in the underpinning research have also supported conservators, through consultancy, in the identification of problem materials and their subsequent choice of conservation treatments. One important example uses the protein analysis method, developed by Singer and McGuigan (2007). The method has been adopted to provide analysis on important artefacts, including works by Munch discussed above.

Singer's research has contributed to further authentication of key works in museum collections from earlier periods. The research has influenced the production of a BBC series, 'Fake or Fortune' (September 2012) where Singer contributed analytical results in collaboration with The National Museum of Wales and Tate, concerning works attributed to JMW Turner. Singer examined the binding media in the painting Beacon Light, the result of which in the context of art historical analysis came to the conclusion that this painting could be assigned to Turner for the first time.

**5. Sources to corroborate the impact**

1. Aslaksby, T.E., 'The Sick Child. A painting in transformation – techniques and treatment' (2009) in *Edvard Munch The Sick Child*, ed. Ustvedt, O. and Aslaksby, T.E., Nasjonal Musset, Oslo, pp135-155. Available from Northumbria University on request. This article describes the conservation of one version of "The Sick Child", a painting with a complex and delicate layer structure of paint. Singer's input to this project was to provide invaluable definitive information on this layering and Munch's choice of media such that successful conservation of the work has led to its continued public exhibition.
2. Topalova-Casadiago, B. 'Technical Aspects of Edvard Munch's Paintings' (2009) in *Edvard Munch. Complete paintings. Catalogue raisonné*, vol. II., ed. Woll, G. London, pp425-457. This chapter describes technical inspection of key paintings in Munch's oeuvre. Singer's input in terms of identifying materials and methods in complex multilayer works offers a definitive general resource to conservators charged with repairing or stabilizing Munch's work for posterity.
3. Topalova-Casadiago, B. 'The Two Painted Versions of Scream. An Attempt at a Comparison Based on Technical Painting Characteristics' (2008), in *The Scream* (Munch Museum, Exh. Cat.) Oslo, pp86-99. Available from Northumbria University on request. This chapter is a technical art historical comparison between two versions of the same subject. Singer provided the analysis of binders, pigments and surface treatments which enabled the author's conclusions.

## Impact case study (REF3b)

4. Landro, G., Topalova-Casadiego, B and Ufnalewska-Godzimirska, M.: 'The Conservation of the Munch Museum's *Scream*. Examinations and Observations' (2008) in *The Scream* (Munch Museum, Exh. Cat.) Oslo, pp57-74. This chapter summarizes the technical inspection of one version of Munch's *Scream* which has led to a greater understanding of its creation and a conservation plan to ensure its future as an exhibit. Singer identified the materials used by the artist, data which is core to the process of inspection.
5. Milnes, A., and Topalova-Casadiego, B., 'The Conservation of the Munch Museum's *Madonna*. Examinations and Observations' (2008), in *Madonna* (Munch Museum, Exh. Cat.) Oslo, pp73-89. This chapter summarizes the technical inspection of a Munch's *Madonna* which has enabled its owners to develop a conservation plan to ensure its stability as a museum exhibit. Singer identified the materials used by the artist, enabling dissemination of details of Munch's technique and materials to conservators, researchers and the general public (as this book is on sale in the Museum to visitors).
6. Christine Powell and Zöe Allan, 'Italian Renaissance Frames at the V&A' (2010), *A Technical Study*, Butterworth-Heinemann, pp94-95, 103-105, 113, 120,149, 156-158,177-178,195 and 237-238. The references in this source illustrate the general applicability of the methods of analysis pioneered by this group to historical objects in museum collections as well as works of art on canvas and paper.
7. Doherty, T., Phenix, A., Schonemann, A., and Rizzo, A. (2008), 'Oudry's painted Menagerie. A technical study of selected works from a series of animal portraits by Jean-Baptiste Oudry with reference to the artist's lectures on painting techniques to the French Royal Academy', in *Study and serendipity: testimonies of artists' practice, Proceedings of ICOM-CC Art Technological Source Research (ATSR) working group, 3rd International Symposium, 12-13 June 2008, Glasgow University, UK*, and the summary thereof: [http://www.getty.edu/conservation/science/about/oudrey\\_tech\\_studies.pdf](http://www.getty.edu/conservation/science/about/oudrey_tech_studies.pdf). This document describes the conservation of a set of badly damaged paintings where the technique and materials of the artist was known to some extent from his public lectures, and so the Northumbria group were able to corroborate or elucidate the artist's own words to the benefit of conservators.
8. Statement concerning the BBC programme *Fake or Fortune* and the DVD of the original broadcast of 'From Ugly to Beautiful' can be made available on request from Northumbria University. \*Both programmes are evidence of research outputs (specifically material analysis and discovery of evidence of technique) being used by sector experts in front of a public audience.
9. Member of the Authentication Committee for the Francis Bacon Estate can be contacted to corroborate the impact of the research on the committee's decisions around attributing authenticity and assisting conservators in designing treatments.