

Dr Andrew S Smith FGS, FIQ, FHEA, CUEW, MIMS

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EMPLOYMENT AND
TEACHING
EXPERIENCE.

Current:

Senior Lecturer
Programme Leader Cement, Clay & Concrete Technology
Mineral Products Centre, University of Derby
Sept 2015 – present

Chairman TC 125 – Masonry Products
European Standards Technical Committee
CEN, Brussels
Apr 2014 – present

Past:

Head of Sustainability & Construction Materials
Lucideon Ltd
Aug 2012 – Sept 2015

Principal Consultant
Sustainability & Construction Materials
Ceram Group
Sept 2008 – Aug 2012

Materials Group Manager
Ceram Building Technology
Sept 2003 – Sept 2008

Technical & Research Manager
Ceram Building Technology
Apr 2002 – Sept 2003

Head of Research & Technical Development
Hanson Bricks Europe
Aug 1999 – Feb 2002

Research & Development Manager
Hanson Brick Ltd
Jun 1997 – Aug 1999

Analytical Consultancy Manager
Dept of Geology, University of Leicester
Oct 1992 – Jun 1997

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<p>EMPLOYMENT AND TEACHING EXPERIENCE.</p>	<p>Research Assistant Dept of Geology, University of Leicester Oct 1989 – Sept 1992</p>
<p>EDUCATION (HE)</p>	<p>Post Graduate Certificate in Higher Education PGCertHE University of Derby 2017</p> <p>Doctor of Philosophy PhD Alkali Silica Reaction in Concrete; the role of quartz bearing aggregates University of Leicester 1997.</p> <p>Master of Science MSc Industrial Mineralogy University of Hull 1989.</p> <p>Bachelor of Science BSc (Honours Upper Second Class) Geology & Physical Geography University of Hull 1988.</p>
<p>MEMBERSHIP OF PROFESSIONAL BODIES</p>	<p>Fellow of the Geological Society of London (FGS) Fellow of the Institute of Quarrying (FIQ) Fellow of the Higher Education Academy (FHEA) Member of the International Masonry Society (MIMS)</p>
<p>PROFESSIONAL SKILLS & MEMBERSHIP OF PROFESSIONAL COMMITTEES</p>	<p>Legal/Expert Witness Training & Qualifications: Cardiff University / Bond Solon (CUBS) Expert Witness Certificate (Awarded) (CUEW) Bond Solon Training: Law & Procedure Modules 1&2 Bond Solon Training: Cross Examination Bond Solon Training: Expert Witness Report Writing & Courtroom Skills.</p> <p>Other Professional Training: First Line Managers Training (Instep) Presentation Skills (Instep) ISO 50001 (SGS) Energy Management EU Emissions Trading Scheme (EUETS) Lead Verifier</p>

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<p style="text-align: center;">PROFESSIONAL SKILLS & MEMEBRSHIP OF PROFESSIONAL COMMITTEES</p>	<p>Professional Committee Membership:</p> <p>European: <u>Chair of TC 125 Masonry Products</u> (European Standards Committee). TC 125/WG4. Test Methods for Masonry Products and Mortar. TC125/CG/TG2. Regulated Dangerous Substances – Masonry Products Task Group TC 351/WG1. Regulated Dangerous Substances in Construction Products (2007-2012) Tile & Bricks Europe (TBE) LCA Working Party. TBE Regulated Dangerous Substances Working Party.</p> <p>UK: Construction Products Association (CPA) Resource Efficiency Forum (Chairman 2014-15) Member of the Stone Federation of Great Britain Technical Committee (2008-2015) BSI Technical Committee CB/30 Construction Products Advisory Committee (2014 -) BSI Technical Committee B557 Regulated Dangerous Substances in Construction Products. (2005 -) BSI Technical Committee B519 Masonry Products (2002 -) BSI Technical Committee B519/WG4 Test methods for Masonry Products and Mortars. (2002 -) Brick Development Association's Brick, Mortar and Paver Standards Working Party. (1997 – 2015) Brick Development Association's Sustainability Working Party. (2008 -) Geological Society of London - Accreditation Committee (2015 -)</p>
<p style="text-align: center;">PUBLICATIONS</p>	<p>Books & Reports:</p> <p>Sustainability of Construction Materials 2nd Ed Published by Woodhead Publishing (2016) Chapter 11 Sustainability of masonry in construction Smith A.S., Bingel. P, Bown. A</p> <p>Institute of Civil Engineering's "Manual on Construction Materials" Published by Thomas Telford (2009): Chapter 35 Defects in masonry Walls Smith, A.S. and Edgell, G.J. Chapter 36 Sustainability and recycling of masonry materials Smith, A.S. & Forth, J.</p> <p>Clay Bricks & Clay Blocks Resource Efficiency Action Plan. Report 018. (2013) The Green Construction Board, London. Technical Author: Smith, A.S.</p>

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PUBLICATIONS

Precast Concrete Resource Efficiency Action Plan. Report 019. (2013) The Green Construction Board, London.
Technical Author: **Smith, A.S.**

Smith, A.S. 'Recycled Glass as a Brick Fluxing Agent.' Proceedings of the International Conference on Sustainable Waste Management and Recycling. London. Thomas Telford Publishing. ISBN 0-7277-3284-6 (2004). pp 149-165

Smith, A.S. 'To demonstrate commercial viability of incorporating ground glass in bricks with reduced emissions and energy savings.' Waste and Resources Action Programme R&D Report: Glass. ISBN 1-84405-101-5. (2004) p36

Smith, A.S. and Dunham, A.C. 1992. Undulatory Extinction of Quartz in Granites and Sandstones. TRL Contractors Report CR 291. p 63

Conferences & Proceedings:

Smith, A.S., 2017 Evaluation of Atypical sulfate attack or a new form of mortar deterioration. Proceedings of the 13th Canadian Masonry Symposium, Halifax, NS, Canada

Smith, A.S., 2016 Freeze-thaw durability of cement-lime-sand mortars. Proceedings of the 16th International Brick & Block Masonry Conference, Padua, Italy

Smith, A.S. & Edgell, G. J., 2016. Development of a masonry mortar freeze-thaw laboratory test method and the performance of CEM II mortar masonry panels. Proceedings of the 16th International Brick & Block Masonry Conference, Padua, Italy

Smith, A.S., Verhelst, F., Denayer, C., Givens, R. 2014 Quantifying the benefits of lime additions in cement based mortars. Proceedings of the 9th International Masonry Conference, Guimaraes, Portugal.

Smith, A.S., Verhelst, F., Denayer, C., Givens, R. 2013 Hydrated lime additions to cement mortars; quantifying the benefits to mortar durability in masonry structures. Proceedings of the 13th Canadian Masonry Symposium, Vancouver, Canada.

Smith, A.S., 2013 Conference Keynote Address: Making environmental claims; Help or hindrance when selling bricks. 59th Clemson Brick Forum, Anderson, SC, USA

Smith, A.S., 2013 Innovation; The role of testing. Brick Development Association – Innovation Day, ARUP, London.

PUBLICATIONS

Smith, A.S., 2012 Sustainability & Economic Drivers in the UK Brick Manufacturing Sector; Past, Present & Future. 17th Extractives Industry Geology Conference, Edge Hill, UK

Smith, A.S., 2011 Leaving your mark; Footprinting as a business tool. 57th Clemson Brick Forum, Anderson, SC, USA

Smith, A.S., 2006 Regulated Dangerous Substances – impact upon “sustainable” construction products, SUMACON Conference, Edinburgh

Smith, A.S., 2006 – Brick making raw materials from MARSS, 52nd Plant Operators Forum, Clemson University, SC, USA

Smith, A.S., 2006 Bricks from MARSS. IOM³/ICTa Conference, Bretby.

Smith, A.S., 2006 Geomaterials from Civil to Criminal Law; one small step for the geoscientist. Forensic Geoscience Conference, Geological Society of London. London.

Smith, A.S. 2002. Brick making: the ultimate waste repository. Industrial Minerals and Extractive Industry Geology. Geological Society of London Special Publication. pp323-326

Harvey, P.K., Jackson, P.D., Lovell, M.A., Williamson, G., Ball, J.K., Ashu, A.P., **Smith, A.S.**, Flint, R.F. 1994. Structural implications from fluid flow and electrical resistivity images in aeolian sandstone's. SPWLA 35 Annual Logging Symposium, 2 (p. 1-7(paper LL)). Tulsa, Oklahoma, USA.

Smith, A.S., Dunham, A.C., West, G. 1992. Undulatory Extinction of Quartz in British Hard rocks. 9th International Conference on Alkali-Aggregate Reaction in Concrete, London. pp 1001-1008.

Journals

Smith, A.S. 2007 Sustainable House Building; Brick still has a role to play. Brickyard Road, Journal of the National Brick Research Centre, Clemson, SC, USA

Smith, A.S. 'Clay Roofing Tiles – Frost Resistance – Single European Test method.' Clay Technology. Vol. 97. August 2004

Smith, A.S. 'Green Bricks from Green Glass.' Clay Technology. Vol. 95 May 2004

Smith, A.S. 'Waste Not Want Not.' Clay Technology. Vol. 93. February 2004

<p style="text-align: center;">PUBLICATIONS</p>	<p>Smith, A.S. 2004. Wrapping up Recycling – The WRAP Approach. Clay Technology No94. pp2-3</p> <p>Brown, A. G., Smith, A.S. and Elmhurst, O. 2002. The combined use of pollen and soil analyses in a search and subsequent murder investigation. Journal of Forensic Sciences 47, pp614-618</p> <p>Smith, A.S. 2002 Optimizing Firing Through TTT Analysis. Brick and Clay Record (Special Supplement to Ceramic Industry).</p> <p>Smith, A.S. 2001. Brick making – The ultimate waste repository. Clay Technology No.79, pp8-9</p> <p>Smith, A.S. 1999. Lime Mortars - Look before you leap. Brick Bulletin. Technical Notes., pp29-31.</p> <p>Smith, A.S. 1999. Durability of Mortars. 6th Conference & Exhibition of the European Ceramic Society. Brighton UK. Vol 2 pp371-372</p> <p>Harvey, P.K., Jackson, P.D., Lovell, M.A., Williamson, G., Ball, J.K., Ashu, A.P., Smith, A.S., Flint, R.F. 1995. Electrical Resistivity Core Imaging III: Characterisation of an Aeolian Sandstone. Scientific Drilling 5(4), pp165-176</p>
<p style="text-align: center;">HE RESEARCH SUPERVISION</p>	<p>PhD Supervision:</p> <p>Jodie Davies (Sept 2017 start) Industry Sponsor -Forterra plc <i>Pulverized Fuel Ash (PFA) for use in the production of Autoclaved Aerated Concrete (AAC) Blocks</i> (Part-time registration)</p> <p>Catherine A. Scott (2004) <i>A chemico-physical study of anhydrous and hydrated hydraulic limes.</i> Keele University – Acted as Industry Supervisor as part of the Potgraduate Training Partnership (PTP) between Keele University & CERAM Research Ltd.</p> <p>M.Sc Supervision:</p> <p>Joint supervision of c.60 MSc students on the MSc Industrial Mineralogy Programme at the University of Leicester (Dept of Geology) between 1990 – 1997.</p>

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KTP/KEIs Academic Supervision:

Emma Shepherd – KPT Student with Forterra plc 2yr Project Oct 2017 – Sept 2019 (2nd Academic Supervisor)

Joe Williams – KEIs Student with Longcliffe Quarries Ltd (9 month project Aug 2017 – April 2018).

Personal Statement:

An experienced, enthusiastic, pragmatic and professional Senior Manager, Principal Consultant, Technical Expert and now Academic Educator and Researcher within the fields of Mineral Products, Construction Materials, Sustainability, and Resource Efficiency.

My career to date has spanned three distinctly different employment environments, starting in academia with University based teaching and research, followed by technical support and senior operational management of a Research & Technical Department in a multi-national construction products group, and latterly as Principal Consultant and Senior Manager in a commercial materials research, consultancy and testing organisation. As such I believe that I have come away, at each transition, with a wealth of knowledge, skills and experience that I can carry forward and enhance by ability to deliver in new roles.

I've been involved in construction materials all of my working career, starting as an industrial minerals geologist, with a focus on the assessment of the raw materials, both in the field and in the laboratory, in terms of suitability and quality, through to manufacturing and production support, product testing and standards compliance, through to in service investigations. I have gained experience in the assessment of a very wide range of materials used in construction applications, however I'd consider, heavy weight construction materials, cement, lime and concrete based, clay based and natural stone based materials to be my main area of expertise.

In the past 15 years I've spent a significant amount of time working with industry on projects where a thorough understanding of the materials and processes have enabled me to provide assistance in the reduction in energy consumption, and associated GHG emissions, either by process modification, or by material substitution. From my understanding of how to measure, monitor and report energy and GHG (carbon) impacts throughout a process, gained from EU ETS verifications, ESOS and ISO 50001, carbon and GHG footprinting, Life Cycle Analysis and Environmental Product Declaration related project, I've been keen to deploy a holistic approach to energy and GHG emissions management, as often it's a combination of interventions or actions that can deliver the maximum impact.

From a sustainability and resource efficiency perspective, this has allowed me to undertake evaluation of how large organisations and processes operate, including supply chains and stakeholder groups, and to translate this operational information into deliverable, defined and target driven sustainability objectives, actions and solutions.

I have worked within the field of sustainability and resource efficiency for over 20 years, under a number of different guises, however, be it in academia, industry or as a consultant, the primary objective has always been to deliver pragmatic and practical solutions to every project I have been involved with. My aim is to provide the client and colleagues with a comprehensive, clear and understandable solution or interpretation, that when enacted will result in measureable benefits.

I regularly write and present papers at meetings and conferences, within my specialist fields of construction materials, sustainability, and resource efficiency. Most recently I been an invited presenter at the Canadian Masonry Symposium in Halifax, Nova Scotia, at the Innovation and Sustainability Conference at ARUP's offices in London, and I have in recent years been invited to present the keynote address to the North American Brick Manufacturers Forum at Clemson SC (2014), and the Clay Brick Association of South Africa (2016) where I highlighted the opportunities for sustainability and resource efficiency activities within the sector, to manufacturers and regulators in the US and Canada, and more recently in South Africa, and how they can be a benefit and not a burden on business activities.

From my personal and professional experience with large and complex organisations, including

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those that operate over multiple sites and internationally, I have found that the delivery and management of projects on materials and sustainability have not only been delivered via management systems, but requires engagement and “buy in” from all employees, suppliers, the clients and the wider stakeholder community. It is therefore important to develop and communicate a clear materials, manufacturing and sustainability strategies and policies, including the Why’s as well as the What’s and How’s, if continual improvement is to be achieved.

Current Role:

Senior Lecturer and Programme Leader: Cement, Clay & Concrete Technology Mineral Products Centre, University of Derby

Academic management, development and delivery of distance learning programmes at Level 4 (Certificates), Level 5 (Foundation Degrees and Diplomas) on programmes relating to Cement, Clay and Concrete based Mineral Products within the Mineral Products Centre.

Development and delivery of research projects, consultative research (consultancy) and other income generating opportunities within the Mineral Products Centre, including collaborative research with other UK and international HE establishments, Industrial partners and Governmental Agencies.

Chairman of CEN TC 125 – European Standards Technical Committee for Masonry Products. This standardization committee is responsible for the development and publication of European Standards that relate to the Product Specification and appropriate Test Methods associated to construction materials that fall within the scope of “Masonry”. It provides a platform for the production and sale of masonry construction products across Europe without technical barriers to trade. The committee represents all 27 European Member States plus the UK and a number of EEA Countries and its membership is based on Technical Experts, National Standardization Bodies, eg BSI, DIN, AFNOR, Industry representatives, and Trade Bodies and Associations.

Employment History:

Head of Sustainability & Construction Materials Lucideon Ltd

Principal Consultant and Head of 2 operational consultancy groups within the Lucideon Group of companies, namely Sustainability, and Construction Materials. I reported directly to the Lucideon’s General Manager and was a member of the Senior Management Team. My role had delivery, P&L, business development and budget planning responsibility for both business streams, as well as my own portfolio of clients within Construction Materials and Sustainability/Resource Efficiency.

In addition to these operational activities for Lucideon, I was also a member of both CEN European Standards Technical Committees, and their UK (BSI) Mirror Committees (which I still continue in my role at the University of Derby). I am currently Chairman of CEN TC 125 the European Standards Committee responsible for Masonry, which includes, masonry units (clay, calcium silicate, aac, aggregate concrete, manufactured stone and natural stone), masonry mortars and renders, and ancillary components (wall ties, lintels etc). I am also a UK “expert” in Regulated Dangerous Substances, specifically release of these to soil, surface and ground water, and the development of Environmental Product Declarations (EPD) in relation to construction materials and more specifically those that fall within the remit of Masonry.

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I am also an "invited" industry expert on a wide range of industry or sector specific Working Groups and Technical Forums:

- European Lime Association's (EuLA) Lime Industry Roundtable Forum,
- Tile & Bricks Europe's (TBE) Sustainability, Dangerous Substances and LCA/EPD Working Parties,
- Construction Products Association's (CPA) as Chair of the Resource Efficiency Forum, as well as being an active member of their Sustainability Policy Group,
- Brick Development Association's (BDA) Brickwork and Standards Working Group and the Sustainability and Manufacturing Working Group.

Sustainability

As Head of Sustainability, I worked with all the Lucideon Group companies, Lucideon, Lucideon CICS and Lucideon M&P Labs, in the development and supply of consultancy services in a range of sustainability areas, primarily with a focus on Resource Efficiency; waste, water, carbon (energy and emissions) and materials (primary and alternatives), predominantly within the materials based manufacturing sector.

My specific aim was to work with our clients to help them understand and quantify their operational sustainability impacts and then work with them in the development/instigation/delivery of sustainability and resource efficiency strategy and policy. In doing so the intention was to enhance our client's sustainability credentials, deliver cost reduction and operational efficiency whilst maintaining regulatory environmental protection objectives.

I managed and delivered as appropriate, these consultancy services, and thus have built a good working knowledge of the following aspects of Lucideon's Sustainability/Resource Efficiency Consultancy Service offerings;

- Resource Efficiency Action Plans (including supply chain stakeholder engagement)
- EMS Consultancy & Implementation (ISO 14001, 50001)
- Environmental Footprinting and Reporting, including GHG (EU ETS & CCA), Carbon (ISO 14064-1, PAS 2050), Energy (ESOS), Water, Environmental Product Declaration (EPD) for Products, Processes and Organisations and other Life Cycle Assessment and Inventory procedures.

Construction Materials

As Head of Construction Materials and as a Principal Consultant, I supported both the Construction Services Division and the Testing Services Division within Lucideon in the UK and the construction consultancy and testing activities of the Lucideon M&P Labs in the USA. We operated on a project based flexible team approach, and I provided day to day management of the consultancy work within Construction Materials and had overall responsibility for business development, including client engagement, project scoping and quotations, and project delivery within this group.

I personally specialise in "heavy" construction materials, primarily cement/concrete based products, clay based construction materials, and natural stone construction products, and have significant industry, academic and consultancy experience in these areas, ranging from raw materials evaluation and assessments, through the manufacturing process, product development including RD&I, testing, evaluation and compliance, and in service investigations, including product defect, installation defects.

Within the RD&I, and product testing and evaluation, I'm an expert in the testing methodologies used for the assessment of specific properties, typically characteristics that

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relate to a products "fitness for purpose". I have a particular interest and specialism in the assessment of durability, including freeze-thaw action upon construction products exposed to weathering processes, and am currently one of the lead researchers in the development and refinement for the laboratory assessment of both construction products including clay bricks, mortars, natural stone/slate, and construction systems, particularly external and internally applied (retrofit) insulation (EWA and IWA) for solid masonry.

I also have an interest in raw materials, including secondary raw materials and materials derived from construction and demolition waste, along with by-products and wastes from other sectors. I'm a keen advocate of the principles of the "Circular Economy" and use this philosophy in driving manufacturing change to provide, economic, technical, strategic, environmental and marketing advantage for clients.

Over the past 10 years I have also undertaken due diligence investigations on behalf of major financial investment institutions, relating to potential investments in existing manufacturing facilities, or into new and novel manufacturing/product proposals, in both the UK and Europe (including the former Soviet States).

I am also a trained construction materials expert witness, holding the Cardiff University – Bond Solon Expert Witness Certificate, gained in 2005. I have undertaken expert witness investigations as a Single Joint Expert Witness as well as for one or other of the parties, in both civil and criminal proceedings where construction materials and interpretation of analysis form an integral part of the evidence being presented. Whilst this is typically done by Expert Witness Statements and Reports, I have direct experience in giving "*evidence in chief*" during court proceedings. In addition I regularly assist private individuals, companies and insurers in respect of claims relating to construction materials defects or issues with installation.

Lucideon Limited (formerly Ceram Research Ltd)

- Head of Sustainability & Construction Materials – Lucideon Group 2012-2015
- Principal Consultant, Sustainability & Construction Materials - Ceram Group 2010-2012
- Principal Consultant, CERAM & CICS Carbon Consulting 2008-2010
- Materials Group Manager, CERAM Building Technology, 2003-2008
- Technical & Research Manager, CERAM Building Technology, 2002-2003

Through promotion and training I have developed skills in consultancy and project management relating to the assessment of construction materials in manufacture or in use, and latterly the development and delivery of sustainability and resource efficiency consultancy to a wide range of clients, not only within construction but within the wider "manufacturing" sector, most recently in agriculture and processed frozen food production with a multi-national supplier.

My main roles include:

Management:

- General Management duties including; P&L, business development and budget planning.
- Specific management of project teams in order to deliver on time in full.
- Development and Management of Ceram's Sustainability objectives (operational)

Sustainability & Resource Efficiency (Consultancy):

- Resource Efficiency; waste, water, carbon (energy & emissions) and materials.
- Resource Efficiency Action Plans including stakeholder engagement
- Sustainability Strategy and Policy Development
- Environmental Management Systems (ISO 14001, 50001)

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- Footprinting (carbon, water, EPD)
- Research & Publication of Technical Papers and Guidance Documents
- Conference Papers/Presentations

Construction Materials (Consultancy):

- Manufacturing Process and Optimisation
- Primary and Alternative Raw Materials (evaluation of)
- Development of European Standards for Product Assessment
- Site Based and Forensic Investigation into product defects and failures
- Expert Witness Reports
- Research & Publication of Technical Papers
- Conference Papers/Presentations

For both Sustainability and Construction Materials projects, funding currently comes from one of 3 primary sources, either through the Lucideon Technology Partner's Membership Scheme (5%), through Public Funded sources (10%) and from industry and commercial clients (85%).

Hanson Bricks Europe Ltd

- Head of Research & Technical Development, Hanson Bricks Europe, 1999-2002
- Research & Development Manager, Hanson Brick Ltd, 1997-1999

My role within Hanson was in the form of technical support to both the operations (production) and the sales teams, and in the development of new products and processes and product innovation in the wider sense. I managed a technical support team who operated out of 3 national laboratories and an innovation and development team who were based at Head Office in Bedford, and supported the 14 brickworks located throughout the UK.

I reported to the Hanson European Technical Director, and supported the activities of the UK Operations Director and UK Sales Director. Whilst at Hanson I instigated and promoted the development of the use of "alternative" raw materials, using waste materials from other industrial processes in order to produce products with lower environmental impact (principally through reduced firing energy) and reduce operational costs, but also to enhance technical properties, the protection of strategically important raw materials or commercial/marketing activities.

I also represented Hanson's Technical and Environmental Department's interests on the Liaison Groups with local MP's, Environment Agency, Councillors and NGO's in the Bedford and Peterborough areas of operation where the brickworks operations had the highest environmental impacts, mainly through air pollution and odour from the stacks.

University of Leicester Dept of Geology

- Analytical Consultancy Manager, Dept of Geology, Leicester University, 1992-1997
- Research Assistant, Dept of Geology, Leicester University, 1989-1992

Throughout my time at Leicester I taught analytical techniques to MSc and PhD students as part of their studies and supervised or mentored these students through their research.

I originally worked as a Research Assistant on an industrially funded research project with the Transport and Road Research Laboratory, and this formed the basis of part of my PhD research.

Following the end of the project I was appointed Analytical Consultancy Manager in the Geology Department and managed the external commercially funded analytical services,

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generating income for the Department from non-Research Council sources. As such I acted as the point of contact between the scientific support staff and the clients, produced summary reports and where appropriate interpretations for a wide range of geologically related sectors, from minerals to oil and gas exploration.

Whilst a member of staff at Leicester I registered as a part time PhD student, and continued to work on my research topic on a part time basis with the support of the Department. Following completion, I was duly awarded my PhD in 1997.

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