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*Major Research Interest: Colloid Science*

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### Research:

The subject of the research was the characterisation of the physical properties of silica particles on surfaces and to relate them to their internal structures. Subsequently this work was to gain an understanding of the relationship between the physical properties of silica particles and the abrasion produced on surfaces by brushing. This research was in collaboration with Professor Martin Addy from Bristol's Department of Oral & Dental Science, since the types of silica involved in the study are used in the manufacture of toothpaste and Professor Rob Richardson from the Physics Department, Bristol for the X-rays scattering facilities.

An abrasion experiment was designed and the scratching action was analysed. The wear caused by the silica was measured by optical profilometer. The internal structure of the silica particles was determined by using small angle neutron and x-ray and static light scattering techniques in addition to nitrogen adsorption and mercury intrusion techniques. Particles of silica gel or precipitate were argued to have different intermediate levels of structure with a related co-ordination number and consequently a related scratching distribution. These parameters control the degree of abrasiveness.

To be published three articles: The relationship between the microstructural properties of colloidal silica and the development of nanoscale surface features in abrasion

### Publications:

'Looking to the heavens: climate change experiments' Science in School, 12, Summer, 34-39 Available at: <http://www.scienceinschool.org/2009/issue12/climate> Shallcross D.E., Harrison T.G., Henshaw S. and Sellou L., (2009)

'Fuelling interest: climate change experiments', Science in School, 11, Spring, 38-43. Available at: <http://www.scienceinschool.org/2009/issue11/climate> Shallcross D.E., Harrison T.G., Henshaw S. and Sellou L., (2009)

Big smile! Toothpaste chemistry, Chemistry Review, 17, 2. Sellou L & Harrison T.G. (2008)

Two Languages, One Aim: Two Case Studies from the 'Science in Schools' Project, France. Harrison T.G., Shallcross D.E., Sellou, L. & Hemard C (Awaiting publication)

**LabSkills** is an interactive, web-based laboratory manual, which has been developed by Bristol ChemLabS staff in association with Learning Science Ltd: <http://www.labskills.co.uk/>