Tuesday 6th September 2011

Seminar at the Society of Glass Technology Annual Conference
at the University of Oxford,
commemorating the 300th anniversary of the birth of
Mikhail Vasilievich Lomonosov

Abstracts

09:00 Stained Glass - A Glass Scientist's Perspective
David Pye
10:00 Old Kingdom Egyptian Faience: Some New Perspectives
Linn Hobbs

10:40 Refreshments

11:00 Glass Furniture in St Petersburgh
John P Smith
11:40 The Prince and the Popper: Prince Rupert's Drops and early modern natural philosophy
Anna Marie Roos
12:20 Insights into Restoration Glass Technology from the Archives of the Royal Society
Colin Brain

13:00 Lunch

14:30 Walking tour of the Historic Stained Glass of the Oxford Colleges
Paul San Casciani
(places on this tour are strictly limited and prior booking is essential - please see Conference Staff if participation is desired)

17:00 End of Seminar

History & Heritage Group of Glass
a special interest group of the SGT

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Stained Glass - A Glass Science Perspective
David Pye (Professor Emeritus, Alfred University, USA)

Abstract:
The field of Stained Glass Artistry can be regarded as the perfect intersection of art, science and engineering which has enriched our lives for centuries. From a glass science perspective, some of these accomplishments can only be regarded as remarkable as artists, architects, craftsmen and engineers sought to exploit the fundamental challenge before them, namely, to sculpt, transfer, and display the full spectrum of light in our churches, homes, and other architectural creations. This presentation will examine some of the fundamentals of glass science that were pivotal in achieving these results and also suggest new approaches that might lead to new artistic creations for the enjoyment of all.

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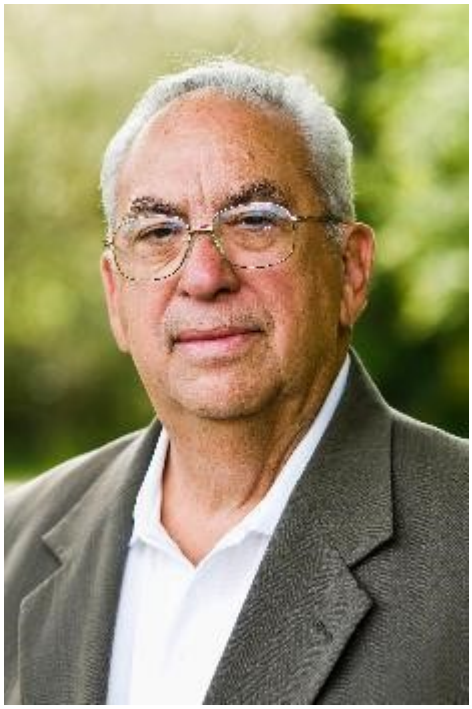
About the Presenting Author:



L. David Pye, a member of Alfred University's Class of 1959 as well as dean and professor of Glass Science, emeritus, Alfred University, and chief executive officer, The Empire State Glassworks, LLC, will be awarded Distinguished Life Membership in the American Ceramic Society for lifetime achievements in the field of ceramics. This award, the highest bestowed by the American Ceramics Society, will be presented Oct. 18 in Houston, TX, at the society's annual meeting.

He served as president of the American Ceramic Society, 2007-2008, and is editor of the society's newest publication, *The International Journal of Applied Glass Science.*

As dean of the New York State College of Ceramics, Pye led the establishment of several new academic programs in electronic arts, engineering, and materials science that helped the college reach record levels of sponsored research. Earlier this decade he played a lead role in establishing the Kazuo Inamori School of Engineering.

He was presented the President's Award by the International Commission on Glass for lifetime contributions to glass science and engineering.

His biography appears in several standard references including Who's Who in the World, Who's Who in America, and Who's Who in Engineering.

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Old Kingdom Egyptian Faience: Some New Perspectives

Linn Hobbs, Drew Whisenant, and Leslie Dewan (Massachusetts Institute of Technology, USA)

Abstract:
Egyptian faience is essentially a glass-ceramic comprising finely-divided quartz held together by an ostensibly soda-lime silicate interstitial glass covered by a glaze layer incorporating transition-metal ion coloration. This material was produced continuously from the pre-dynastic era (post 4000 BCE) continuously until the Roman period (30 CE), though with evident evolution of both chemistry and processing routes. The generally accepted view is that both interstitial glass and the glaze layer are the result of either cementation or (especially in earlier examples) efflorescence glazing in which alkali additions (soda, potash from plant ash or carbonates, lime from carbonates) react with crushed quartzite upon heating to 800˚–1000˚ C to form a glassy silicate phase. The overall alkali content of the final glass (0.5-3% Na, 0.1-1.5% K, 0.5-3%(Ca +Mg) is insufficient to account for a glass transition at these temperatures, but reaction pathways involving the initially locally high alkali content have been invoked to rationalize the envisaged processing route. Glze analysis has focused more on alkali network-modifier and transition metal cations and minor crystalline phases than on other network-forming elements (besides Si) that are also present (specifically P and Al) and can provide alternative lower-temperature processing routes to a vitreous product. This presentation will review prior understanding and report on ongoing investigations of early dynastic faience by analytical electron microscopy and multi-component network modeling using topological connectivity approaches.

About the Presenting Author:

Linn Hobbs pursues teaching or research interests in three archaeological materials areas: mortars, clockmaking materials, and glass.
Utilitarian use of silicate glasses dates back to Mesopotamian civilizations of the Near-East and extends through the glassblowing artistry of the 16th-19th centuries to the modern container industry of today. Surprisingly, the atomic structure of even simple glasses is not known with certainty, although the influence of structure on properties has long been manipulated empirically.

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Professor Hobbs' research activities centre on characterization, using electron microscopy and diffraction methods of atomic and extended defect structures and microstructures of inorganic non-metals introduced by radiation, implantation, or chemically-driven compositional change. One major program addresses the effects of strong radiation fields, such as found in nuclear reactors, radioactive waste storage, or ion implantation, on the microstructural integrity of ceramics, glasses and semiconductors. An important emphasis of this effort is on radiation-induced crystal-to-glass transformations, studied using topological and molecular dynamics modelling.

Another research area addresses materials and coatings used in orthopaedic and prosthodontic implants and their interaction with the body. Two applications are biomineralization to form bone apposing hydroxyapatite-coated femoral stems in hip prostheses and zirconium oxide scales formed on oxidized zirconium femoral condyles in total knee prostheses.

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Glass Furniture in St Petersburgh
John P Smith

Abstract:
Lomonsov, the Russian chemist, amongst his many other activities was responsible for developing a range of coloured glass, largely for the Imperial Glass Works. There is a well documented occasion when in 1806 the Czar gave the Shah of Persia a large bed, made partially of blue glass, surrounded by fountains, which was delivered with difficulty by Russian soldiers, most of whom died on the trip. A drawing and first hand account of this episode will be presented. The palaces in St Petersburg still contain furniture effectively veneered with coloured glass, some clear some opaque, together with chandeliers and torchieres. To make pictures and wall hangings very thin tubes of coloured glass were made and strung together like beads: the best still extant are in the palace of Orangebaum, about 40 kilometres outside St Petersburg, was which well restored some years ago but has recently deteriorated. Other glass furniture made in Europe later in the 19th century will be mentioned. Finally, when the St Petersburg underground was built in the 1970's all the stations were decorated to greater glory of Soviet Russia; one of these stations has many columns, all clad in cast glass decorative panels.

References:

About the Presenting Author:
John P Smith is a private researcher based in London, UK.

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The Prince and the Popper: Prince Rupert's Drops and early modern natural philosophy

Anna Marie Roos

Abstract:
Prince Rupert's Drops are teardrop shaped beads formed by dropping molten glass into cold water. Brought to England by Prince Rupert of Bavaria (1619-82), the nephew of Charles I of England, the origins of the drops' explosive nature and remarkable tensile properties were a matter of great debate in the early Royal Society. After a demonstration of their composition, fabrication, and physical properties, this paper will elucidate their role in Restoration court life and satire, Robert Hooke's early microscopic observations, and to what extent their explosive power affected the formation of pre-Newtonian theories of the tides.

References:

About the Presenting Author:

Dr Anna Marie Roos is a research fellow in the Modern History Faculty at the University of Oxford, where she is a specialist in early modern history of chemistry and medicine. Before coming to Oxford, Anna Marie Roos was an associate professor of history at the University of Minnesota. Her second book was entitled: The Salt of the Earth: Chemistry, Medicine, and Natural Philosophy in England, 1650–1750 (Leiden, 2007). Her third monograph, entitled Spider Man: Martin Lister, Seventeenth-Century Naturalist and Physician, has received funding from the British Academy, the Royal Society, and the National Science Foundation and will be published in 2011. Dr. Roos has also served as a consultant for BBC Four and was interviewed for its recent television programme, Chemistry: A Volatile History. She has recently filmed a documentary on Newtonian alchemy with National Geographic Channel.

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Insights into Restoration Glass Technology from the Archives of the Royal Society
Colin Brain

Abstract:
Four related threads are prompted by questions arising from the study of the Royal Society Archive. Some are partially answered by materials from that archive. They are:

- What was Prince Rupert's glasshouse at Chelsea?
- What were the 'usual trials' advertised by the Glass Sellers in the London Gazette in 1677 in connection with curing glass crizzling?
- Who was the 'Mr H' cited by Robert Boyle in his workbooks as a source of glass technical knowledge and is he relevant to the manuscript 'Art of Glass' in Dutch in the Boyle papers?
- What was special about the opalescent glass that Oldenburg tried so hard to get a sample of?

This paper will explore these and related issues.

References:

About the Presenting Author:
Colin Brain and his wife Sue started researching the history of British drinking glass more than forty years ago. Much of their research has focussed on the second half of the seventeenth century and has included studying: surviving pieces, archaeological finds, historical documents, printed books, and results from glass analysis and practical experiment (the photograph shows Colin trying out a replica 17th century blowing iron). Throughout their research, Colin & Sue have had a great deal of help from others and learnt a lot (particularly how much they still don't know). Colin is a member of the Board of the Association for the History of Glass.

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