

## Centre for Advanced Structural Ceramics

UK centre for structural ceramics research and teaching, which aims to be world-leading in this key area and to develop links and collaborations with leading industrial and academic groups world-wide.

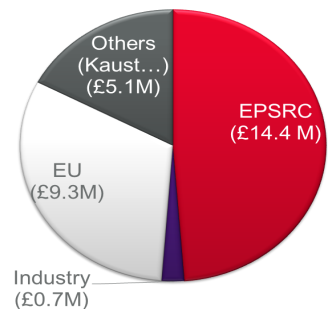
### CASC Newsletter – September 2013

Updating the ceramics community on CASC news and progress

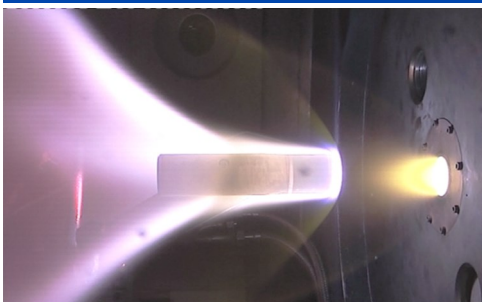
CASC started in July 2008 with EPSRC funding (£5.5M) for a five-year programme and has come to an end by June 2013, and now on will function as an industrial consortium. The CASC has attained potential number of active industrial collaborations from abroad and in the UK. An Industrial consortium has been set up to build on CASC's early success, enable its sustainability and to continue long-term and fruitful relationships between CASC-associated academics and the UK's industrial structural ceramics community.

#### CASC has generated about £30.0 M in 5 years....

CASC has generated a consistent and valuable progress in sourcing funding. As a result, CASC currently holds a research portfolio worth £ 29.5M. CASC has published 111 research articles in the journals and contributed over 137 papers in the conferences. CASC is delivering world-leading research as demonstrated by publishing in top journals, getting invited to give lectures at other top institutions and at international conferences, and by acquiring funds for additional collaborative projects.



#### Materials for extreme environments



Two major grants have been acquired during this period. One is an EPSRC Grant of £5.8M to a research project for 5 years (2013-2017) to Develop Materials for Extreme Environments. It is a collaborative project between Loughborough University (PI, J Binner), Imperial College (Prof Bill Lee, Prof Mike Finnis) and Queen Mary University of London (Prof Mike Reece). A team of four research groups will develop the required understanding of how the processing, microstructures and properties of materials systems operating in extreme environments interact to the point where materials with the required performance can be designed and then manufactured.

#### Bioceramics for bone repair

Another major grant is funded from the European Council project of €3.6 M towards the initial training network for young researchers in the strategic area of bioceramics for bone repair. It is a Marie Curie Initial Training Networks (ITN) funded by FP7, collaborated with 6 academic and 4 industrial partners in the Europe. The Principal Investigator & coordinator is Prof Eduardo Saiz. This research project is for four years from March 2012. This work will demand new scientist and engineers with multidisciplinary backgrounds incorporating fields as diverse as materials science and engineering, orthopedics, tissue engineering, biology, chemistry and biomedical engineering.



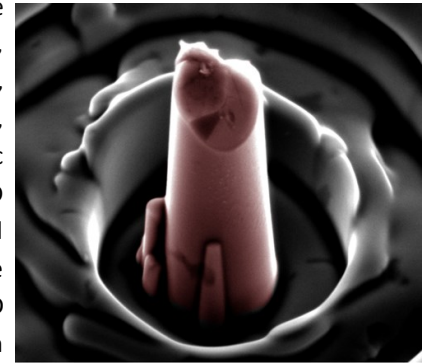
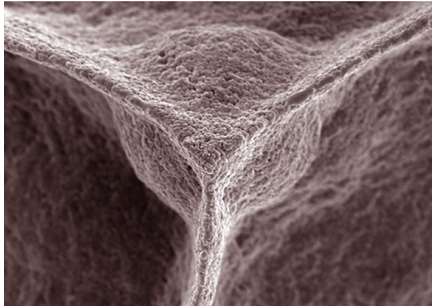
To provide a framework for future collaboration and as a supplement to existing framework agreements at institution level with Imperial College, CASC has signed Memoranda of Understanding (MoUs) with the following research centres:

- Institute of Nuclear and New Energy Technology, Tsinghua University, China

- Institute of Ceramics Research and Education, Nagoya Institute of Technology, Japan
- Energy Research Institute @ NTU, Nanyang Technological University, Singapore
- Institute of Biomaterials at University, Erlangen-Nuremberg, Germany
- Advanced Ceramics Group, University of Bremen, Germany
- Materials Science and Engineering Department, University of Florida

### Current research at CASC

It involves ultra-high temperature ceramics, colloidal processing, calcium phosphate bioceramics, bio-inspired composites, non-oxide ceramics – SiC cutting tools, porous ceramics, carbon-ceramic composites, cements, refractories, metal—ceramic interfaces, mechanical testing at microscale and ceramic armour. CASC funded three external PhD studentships, at Cambridge University, QMUL and Sheffield. All the funded research students have submitted their PhD thesis. [Jianke Ye](#), a PhD



student co-supervised by [Shaowei Zhang](#) (Sheffield/Exeter) and Bill Lee (CASC) worked on surface modification of carbon materials for refractory castable applications. [Ben Milsom](#) supervised by [Mike Reece](#) (QMUL) in collaboration with [Eduardo Saiz](#) (CASC) completed his PhD on the effect of carbon nanotubes on the sintering behaviour of hard and ultra-high temperature ceramics. [Philip Howie](#), supervised by Bill Clegg (Cambridge) in collaboration with Luc Vandeperre and Finn Giuliani (CASC), submitted his PhD thesis on studying small-scale plastic deformation of brittle ceramics.

### Industry Consortium

DSTL, Morgan Technical Ceramics and Rolls-Royce have joined the CASC-Industry Consortium. A third CASC Industry Day, involving presentations and discussions by both industrial and academic members, was held at Imperial 17 June 2013. Discussions are continuing with other companies about how their links with CASC can be strengthened and formalised. The upcoming CASC industry day will be on 17<sup>th</sup> January 2014. For more information about the benefits of membership of the CASC-Industry Consortium, please contact Eduardo Saiz (e.saiz@imperial.ac.uk) or Amutha Devaraj (adevaraj@imperial.ac.uk)

### Professor Sir Richard Brook Prize 2013 — winner selected

All nomination received for the Morgan Ceramics sponsored Professor Sir Richard Brook Prize 2013 for the best ceramics PhD thesis in the UK were judged by the external members of the CASC Steering Group at the annual meeting. The selected winner of the 2013 prize was Dr Huixing Zhang (University of Manchester), for her thesis on “Mechanical and microstructural study of silicon carbide and pyrolytic carbon coatings in TRISO fuel particles” with Professor Ping Xiao.

### New Appointment

[Dr Amutha Devaraj](#) joined the Department of Materials as the CASC Technical Manager in April 2013. Prior to this she worked as a Team Leader (Quality and Materials) at Novacem, a carbon negative sustainable material development company. She is involved in technical and administrative activities of Centre for Advanced Structural ceramics (CASC). She has experience working on the development of wide range of materials including ceramics, glass and polymer for industrial applications. She is also engaged in the BioBone (European FP7 project) and Programme Grant (XMat, EPSRC) within the Department of Materials.



### Fourth Summer School

Following the success of the first three Summer Schools, this is an annual event directed towards ceramic engineers and researchers, working in universities or industries those who wish to enhance their ceramics background or keep abreast of the more recent developments. The fourth ceramic summer school was held during 18-20<sup>th</sup> September 2013 at Royal School of Mines, Imperial College London.

Presenters at the fourth CASC Summer School 2013 were:

- Dr Tim Van Gestel (Forschungszentrum Jülich, Germany)
- Prof Jozef Vleugels (K.U.Leuven, Belgium)
- Dr Jon Molina (IMDEA, Spain)
- Prof Eduardo Saiz (CASC, Imperial College, UK)
- Dr Severin Hofmann (DLR, Germany)
- Prof John Fernie (AWE, UK)

### CASC third summer school, 2012

