



## **Extreme Computing**

**11 - 15 January 2010**

**Milton Hill House Hotel, Oxfordshire**

**This is a 'Call for Participants' to take part in a five day sandpit to look for innovative ways to develop novel software for extreme computing.**

**Closing date for applications: 4pm on 30 September 2007**

### **Background**

Computational science and engineering is increasingly acknowledged to be a vital component of scientific enquiry, alongside experiment and theory. As High Performance Computing (HPC) becomes more powerful and it is possible to model more complex problems in greater detail, simulation becomes an increasingly valuable tool. On the other hand, computer architectures are also becoming more and more complicated.

As the complexity of computer architectures increases, so does the challenge of developing and sustaining a software infrastructure to enable new science through HPC. Fresh approaches to algorithms, software engineering, and application development are now required to enable a step-change in the required adaptive, dynamic and scalable codes for future architectures.

Consequently, the aim of this sandpit is to bring together researchers from a range of disciplines to develop research projects in novel approaches to development of software for "extreme computing". We define extreme computing as pushing the boundaries of what can be achieved with HPC in order to target the largest and most challenging computational science and engineering problems.

### **A Sandpit for Ideas**

The concept of the Ideas Factory is to organise interactive workshops (**sandpits**) on particular topics, involving 20-30 participants. The focus for this sandpit is to explore novel approaches to algorithms, software engineering and application development in order to develop software for extreme computing.

The sandpit is organised by the EPSRC Research Infrastructure Programme. Up to £2 million has been allocated to fund suitable research activities arising from the sandpit. These research activities will need to contain genuinely novel and adventurous

approaches to software development and must be within the remit of EPSRC. Any resulting grants will be issued by EPSRC under EPSRC Grant Terms and Conditions.

## **How the Sandpit Works**

The sandpit is an intensive, interactive and free-thinking environment, where a diverse group of participants from a range of disciplines and backgrounds get together for five days – away from their everyday worlds – to immerse themselves in collaborative thinking processes in order to construct innovative approaches.

The process can be broken down into several stages:

- Defining the scope of the challenges.
- Evolving common languages and terminologies amongst people from a diverse range of backgrounds and disciplines.
- Sharing understandings of the challenges, and the expertise brought by the participants to the sandpit.
- Taking part in break-out sessions focused on the challenges, using creative thinking techniques.
- Capturing the outputs in the form of highly innovative research projects.
- A funding decision on those projects at the sandpit using “real-time” peer review.

The sandpit will be an intensive event. For the well-being of participants, the venue will offer opportunities for relaxation, and the timetable will include networking and other activities as a break from the detailed technical discussions.

A small number of mentors and stakeholders will take part in the sandpit, but will not be eligible to receive research funding. The mentors will act as independent reviewers to determine the allocation of funding to projects emerging from the process through a “real-time” peer review process.

## **Who Should Attend?**

An appropriate mix of participants is critical to the success or failure of these events. We need people from a range of disciplines and backgrounds (from across disciplines that exploit complex simulation and modelling computer science and mathematics). They will also need an enthusiasm and appropriate personal attributes for collaborative research. Participants are welcomed at any stage of their research career.

Expertise is required from a range of disciplines, and applicants should not feel limited by conventional perceptions: the whole IDEAS Factory approach is about bringing together people who would not normally interact. We actively encourage people to apply that are experts in their own research areas but have not yet applied it to HPC software development.

Applicants should note that the research projects funded through the sandpit must be in the remit of EPSRC. This does not exclude participants whose scientific application area is in the remit of other Research Councils who can bring valuable expertise in software development to the sandpit. Expressions of Interest from these participants should focus on their expertise in techniques in software development rather than in their scientific application area.

## **Location and Date**

This sandpit will take place at Milton Hill House Hotel in Oxfordshire from 11–15 January 2010.

An application will be taken to indicate participant availability for these dates and their commitment to attend if short-listed. Please make sure that you are available to attend the whole sandpit before submitting your expression of interest. Full details of the venue, how to get there and the accommodation arrangements will be sent to participants. The sandpit organisers will cover accommodation and subsistence costs at the venue for the duration of the sandpit. Participants will be required to cover their own sundries, bar and travel costs.

## **Applying to Participate in the Sandpit**

Applications are invited from individual researchers who can contribute to the sandpit and resulting research projects. Up to **25 participants** will be identified to take part in the sandpit.

Applicants should complete the short application form (**maximum two sides**). Your answers to these questions will be used to assess your application and suitability to participate in the sandpit event. We are not looking for your academic publication or research track record but rather how you might approach multi-disciplinary problems in a novel area.

The deadline for applications is **4pm on 30 September 2009**.

Applications should be submitted electronically to **extremecomputing@epsrc.ac.uk** by 4pm on 30 September 2009. Please include "**Extreme Computing**" in the subject field.

## **Assessing Applications and Projects**

Applications to attend will be assessed by a multi-disciplinary panel looking to ensure a mix of disciplines and experience.

Criteria will be:

- the potential to contribute to research at the interface between disciplines
- the ability to work in a team
- the ability to explain research to non-experts
- the ability to develop new and highly original research ideas

It is therefore important to give evidence of these from your experience in your application.

Applicants will be informed of the outcome in November 2009.

Please note that because of the large number of applications expected, we will not be able to give individual feedback to unsuccessful applicants.

On the morning of the final day of the sandpit, the research teams that have formed during the sandpit will have the opportunity to present the projects that they have developed to the mentors, now acting as a funding panel. After these presentations and a brief question and answer sessions on them, the mentors will decide on the allocation of resource to the respective proposals, seeking to support those that show:

- Novel highly multidisciplinary research projects, clearly reflecting the distinctive opportunity for creating such projects that the sandpit provides.
- Clear evidence that the team have the capability to deliver their project as a high quality multidisciplinary activity, provided both through the presentation and their activity during the sandpit.
- Clear relevance to, and the potential to make a distinctive and novel contribution to addressing, the challenges around software development for extreme computing.

It is planned that applicants will be provided with funding decisions prior to departure from the sandpit, although these will be conditional upon the subsequent receipt of worked up proposal documentation.

## **For Further Information**

Please contact:

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<b>Name:</b>	<b>Dept:</b>
<p><b>Please spend some time responding to the following questions. Your answers to these will be used to distinguish your application and convince us that you have suitable skills and attitude to participate in the sandpit event. Hint – we are not looking for your academic publication or research track record but rather how you might approach the sand-pit. (Guide: 100 words each)</b></p>	
<p><b>a: What is your personal experience of working with people in teams?</b></p>	
<p><b>b: How would you describe your ability to explain your research to non-experts?</b></p>	
<p><b>c: The sandpit will be especially suited to individuals who are willing to step outside their particular area of interest or expertise, who are positively driven, who enjoy creative activity, who can think innovatively and who can settle in easily in the company of strangers. How well do you see yourself fitting in?</b></p>	
<p><b>d: What would you personally gain from participating in this sandpit event?</b></p>	

**Where did you hear about this IDEAS Factory sandpit?**

**EPSRC Web-site      EPSRC e-mail**  
**University Research Office      Other**

In accordance with the UK Data Protection Act 1998, the personal data provided on this form will be processed by EPSRC, and may be held on computerised databases and/or manual files until after the sand-pit event.