



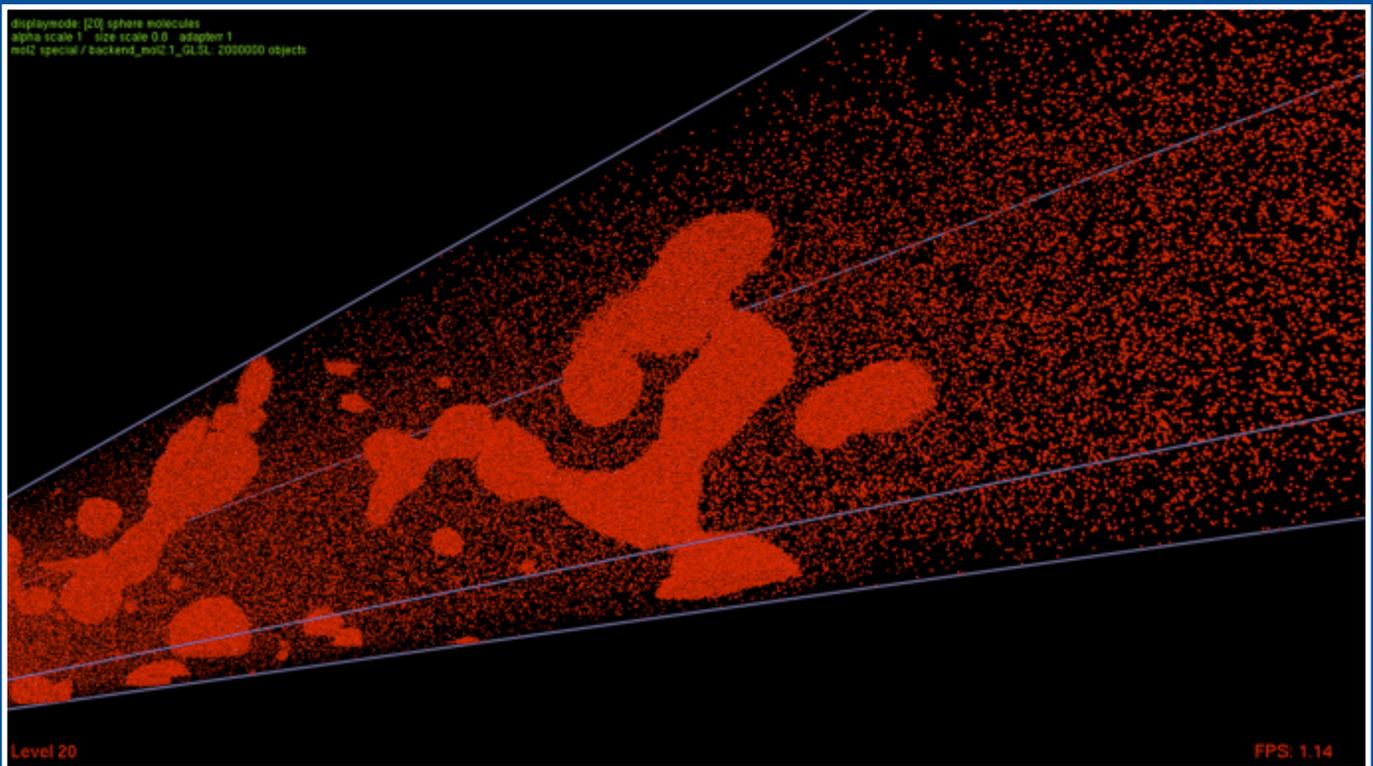
University of  
St Andrews

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# ParaFormance™ Technologies

*Advanced Tools for Supporting  
Multicore Software Development*

ParaFormance™



- Allows engagement with the new MultiCore/ManyCore age, with minimal effort
- Provides automated guidance on choosing the right Parallel structure
- Provides semi-automatic (programmer-in-the-loop) Parallelisation
- Significantly increases programmer productivity
- Suitable for both expert and non-specialist programmers
- Provides increased portability and maintainability
- Greatly improves resilience and robustness of code
- Permits performance and energy estimations

“Rephrase” is a European Union Horizon 2020 funded research and innovation project

“Paraphrasing” is a “high-growth” spinout project (HGSP) funded by Scottish Enterprise

“ParaFormance” is a Trade Mark of the University of St Andrews



# The Technology Opportunity

Processor technology is evolving more rapidly than at any time in the last fifty years. There is a desperate need for new software development tools that can deal efficiently and effectively with the newly emerging classes of multi-core/many-core computers, especially where these comprise different processor classes, e.g. combinations of standard processors with graphical processing units (GPUs). Such systems are starting to appear throughout the computing spectrum, from small-scale embedded systems/mobile platforms through conventional laptop and desktop systems to large-scale enterprise and high-performance computing settings. However, software development technologies and programmer support are lagging well behind these hardware improvements. Software development for multicore/manycore systems is frequently slow, laborious, error-prone and above all, expensive; the resulting software often fails to deliver on the hardware promise; hand-written software will often contain a high level of (complex) bugs; and the software can be very hard to test, debug, maintain and to alter in the long term.

## Our Techniques – Key Benefits

Our technology deals with all of the issues identified above. Emerging from the ongoing “**Rephrase**” and “**Paraphrasing**” research projects, our novel ParaFormance™ techniques significantly increase programmer productivity for multicore/ manycore computer platforms. In some cases, we have even seen 40 hours of manual programming effort reduced to approximately 5 hours work (an 8x productivity improvement, based on an eight-hour working day), *on the initial development cycle and without considering the impact on long-term testing, debugging etc.* Our tools provide the ability for both expert and non-specialist programmers to program complex parallel programs for emerging multicore systems. This maximises the reach of existing expert developers, reducing the need for training and to employ additional specialist and perhaps scarce developers. At the same time it improves the portability and maintainability of parallel programs, so reducing expensive software maintenance and support costs.

## Applications

Our ParaFormance™ software technologies will assist and support software developers in a variety of target application areas, including life science research, large scale image processing, financial systems, oil and gas exploration, video games, high definition video, movies and media, and high performance embedded systems. In fact, there are potential applications everywhere that software is needed to run on multicore/manycore systems.

The University’s expert researchers continue to undertake advanced new research & development activities in this exciting area. The University would welcome enquiries from commercial R & D parties interested in interacting with our Research Group and/ or potentially developing this novel software technology on a commercial scale.

**If you would like to explore this technology transfer opportunity in more detail, please contact:**

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*Additional Information will be made available under a Confidentiality Agreement*

