

# CS Seminar

## ***Reprojection caching: Using spatial and temporal coherence to accelerate real-time rendering***

**Dr. Pedro SANDER**

**Department of Computer Science and Engineering  
The Hong Kong University of Science and Technology**

**Date:**

**June 3, 2010**

**Thursday**

**3:00 pm**

**Venue:**

**Room 308**

**Chow Yei Ching Building**

**The University of Hong Kong**

### **Abstract:**

Driven by the programmability and performance of dedicated graphics hardware, modern real-time rendering systems incorporate more computationally intensive pixel shading and larger geometric models than ever before. Additionally, mobile graphics platforms have emerged that offer exciting application opportunities, but possess far less computational power than desktop computers.

Providing high-quality rendered content on any of these platforms or porting applications from one platform to another requires general purpose methods for trading performance (framerate) for accuracy.

In this talk I will present our work on trying to exploit the natural temporal and spatial coherence in animated image sequences by reusing the results of expensive shading calculations at nearby frames and pixels.

I will first present our basic reverse reprojection scheme that allows pulling shading information from the previously rendered frame to accelerate the computation of the current frame, methods to automatically determine portions of the shader that can be cached, and finally our new technique to amortize the computation of supersampled frames.

These approaches provide an adjustable trade-off between performance and image quality and have proved useful in the industry, e.g., for the Gears of War II video game to accelerate low-frequency lighting effects.

### **About the Speaker:**

Pedro V. Sander is an Assistant Professor in the Department of Computer Science and Engineering at the Hong Kong University of Science and Technology. Dr. Sander received a Bachelor of Science in Computer Science from Stony Brook University in 1998. He then received Master of Science and Doctor of Philosophy degrees from Harvard University in 1999 and 2003, respectively. While attending graduate school at Harvard, he received fellowships from the university's Division of Engineering and Applied Sciences (1998-1999) and Microsoft Research (2000-2002). After concluding his studies, Dr. Sander was a senior member of the Application Research Group of ATI Research, where he conducted real-time rendering and general-purpose computation research with latest generation and upcoming graphics hardware. In 2006, he moved to Hong Kong to join the Faculty of Computer Science and Engineering at The Hong Kong University of Science and Technology.

**All are welcome!**

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