Jim Ching-Rong Lin (林靜榮), Ph.D.
Sr. Computational Scientist,
High Performance Computing Team,
BP Corporation North America Inc.

Jim Ching-Rong Lin has over 14 years of experience for researching and developing computer graphics and high-performance computing software technology systems for the Oil and Gas industry. His research interests include Data Visualization, Virtual Reality, Three Dimensional Interaction, Volume Rendering, Computer Graphics, Geoscience Applications, and GPU Computing. He has been awarded numerous US and international patents, and published many papers with graphics and geophysics conferences. He is a member of IEEE and has been a reviewer for conferences and journals. Jim spent 11 years with Landmark Graphics/ Halliburton in various technology, research, and senior leadership positions, and left the company as Sr. Technical Advisor in 2011. Jim holds a Ph.D. in Computer Science from University of Houston, and MS in Computer Science from University of Cincinnati.

Speech contents

Session 1: Current 3D Graphics Technologies

Since 2002, off-the-self graphics cards have provided the ability to program the graphics processing unit (GPU) as an alternative to using fixed function pipelines. In this talk, I will introduce current 3D graphics hardware and technologies.

Session 2: Parallel Computation using GPUs

Today, graphics hardware has a dedicated, flexible computational engine and the limitations described have been reduced or eliminated. The graphics hardware and software architecture makes programming non-graphical computations on the GPUs easier and more efficient. The computational power of a GPU offers many more flops than the CPU of the machine to which the graphics card is attached. The nature of graphics rendering makes GPU specialized for compute-intensive highly parallel computations. The graphics hardware has a Single, Instruction, Multiple Data architecture (SIMD): each processor in a multiprocessor executes the same instruction, but operates on different data at any given clock cycle. For example, the latest nVidia Quadro FX5800 has 240 processors. Some studies have leveraged these advantages and report tremendous speedups when comparing the same algorithm running on GPU and CPU. In this session, I will discuss parallel computation using GPUs and nVidia CUDA.

Session 3: Oil and Gas Data Visualization and its Researches

I will briefly introduce oil and gas data visualization. Then, I will discuss 3D visualization of Oil and Gas data and current state-of-art 3D visualization applications that enhance and accelerate the interpretation process by allowing geoscientists to gain a better understanding of the structural framework, reservoir characteristics, and subtle details of their data. Finally, I will discuss the researches that we have done in these applications.

Session 4: Virtual Reality (VR) and its Applications and Researches

VR has been fun technology and usually related to video games. VR needs high-performance 3D graphics and non-traditional computer interfaces. In this talk, I will introduce these technologies and researches. Finally, I will discuss how to apply VR into daily used applications.