

GPU Technology Conference, May 14-17, 2012  
McEnergy Convention Center, San Jose, California  
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## Sessions on **Stereoscopic 3D** (subject to change)

**IMPORTANT:** Visit <http://www.gputechconf.com/page/sessions.html> for the most up-to-date schedule.

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### **S0088 - Point Cloud Library (PCL) on CUDA**

**Radu Rusu (Willow Garage, Inc.), Michael Dixon (Willow Garage, Inc.)**

**Day:** Tuesday, 05/15 | **Time:** 2:00 pm - 2:50 pm

**Topic Areas:** Computer Vision; Algorithms & Numerical Techniques; Stereoscopic 3D; Machine Vision

**Session Level:** Intermediate

The Point Cloud Library (PCL - <http://pointclouds.org>) is a large scale, open project for 3D point cloud processing. The PCL framework contains numerous state-of-the-art algorithms including filtering, feature estimation, surface reconstruction, registration, model fitting and segmentation. Due to the massively parallel nature of many of the above algorithms, GPGPU accelerations holds great potential for achieving real-time performance in numerous applications. In this work we demonstrate some of the recent advances in GPGPU programming for 3D point cloud processing, and outline plans for future development.

### **S0412 - A 2-Petaflops Stencil Application with Stereoscopic 3D Visualization - Gordon Bell Prize 2011**

**Takayuki Aoki (Tokyo Institute of Technology)**

**Day:** Tuesday, 05/15 | **Time:** 2:00 pm - 2:25 pm

**Topic Areas:** Supercomputing; Computational Fluid Dynamics; Climate & Weather Modeling; Stereoscopic 3D

**Session Level:** Intermediate

Most stencil applications such as CFD and structure analysis are memory-bound problems. GPU has high performances in both computation and memory bandwidth suitable for them. The TSUBAME 2.0 supercomputer with 4224 GPUs has started since November 2010. We study a metal dendritic solidification by solving the phase-field model. The performance of 2.0 Petaflops was achieved for 4,096x6,500x1,0400 mesh on 4000 GPUs and we received the ACM Gordon Bell Prize in 2011. We also demonstrated several large-scale stencil applications (Lattice Boltzmann, weather prediction and so on) with stereoscopic 3D visualization.

### **S0335 - Live 3D-Video with a Lightfield Camera**

**Christian Perwass (Raytrix GmbH)**

**Day:** Wednesday, 05/16 | **Time:** 2:00 pm - 2:50 pm

**Topic Areas:** Computational Photography; Audio, Image and Video Processing; Stereoscopic 3D; Computer Vision

**Session Level:** Beginner

In this session you will learn what a lightfield camera is, how it works and what you can do with it. Next to the theoretical presentation we give a live demo of the camera system developed by our company Raytrix that gives you 3D live video from a single camera through a single lens currently at up to 10fps with a maximum effective resolution of 3 megapixels synthesized from an 11 megapixel sensor using CUDA algorithms on a GTX580. Post-production features include pixel-wise focusing, depth zoom, variable stereo base-line and base-line rotation.

**S0324 - Content Generation and Real-Time Hologram Computation for Holographic 3D-Displays****Enrico Zschau (SeeReal Technologies GmbH)****Day:** Thursday, 05/17 | **Time:** 10:00 am - 10:25 am**Topic Areas:** Visualization; Stereoscopic 3D; Algorithms & Numerical Techniques; Audio, Image and Video Processing**Session Level:** Beginner

This session will introduce SeeReal's sub-hologram technology to massively reduce hologram computation effort in comparison to classic holography and how SeeReal implemented those still compute intensive algorithms to execute on the GPU to enable viewing of interactive, rich 3D-content on holographic 3D-displays using off-the-shelf graphics hardware. In contrast, you will explore why classic holography does not suit well for interactive applications. Furthermore guidelines to create appropriate 3D-content are presented, including aspects regarding transparency in holograms. Finally the specification and some impressions of SeeReal's 20 holographic prototype will be presented, which allows viewing of live computed holograms showing 3D-content and 3D-video.