



# SIGGRAPH2010

The People Behind the Pixels



# Beyond Programmable Shading II (Re-) Introduction

Aaron Lefohn

Intel



# Beyond Programmable Shading I

Interactive  
rendering techniques  
are created using an inseparable mix of  
**data- and task-parallel algorithms**  
and graphics pipelines



# Beyond Programmable Shading I Recap

- 5 big problems in interactive rendering
  - Cinematic image quality, illumination, programmability, production cost, scaling up
- GPU architecture and parallel programming models
- Use of parallel algorithms for real-time rendering in current games and research



# Beyond Programmable Shading II

Interactive  
rendering techniques  
are created using an inseparable mix of  
data- and task-parallel algorithms  
and **graphics pipelines**



# Beyond Programmable Shading II

- Future real-time rendering pipelines
  - Scheduling: the hard part of making a pipeline
  - Features: micropolygons, motion blur, depth of field
  - Scaling up illumination complexity: deferred rendering
  - Will future pipelines use fixed-function or general-purpose hardware?



# Beyond Programmable Shading II

2:00–2:05 - Aaron Lefohn, Intel

*Welcome and Re-Introduction*

2:05–2:35 - Jonathan Ragan-Kelley, MIT

*Keeping Many Cores Busy: Scheduling the Graphics Pipeline*

2:35–3:10 - Kayvon Fatahalian, Stanford

*Evolving the Direct3D Pipeline for Real-Time Micropolygon Rendering*

3:10–3:30 - Jonathan Ragan-Kelley, MIT

*Decoupled Sampling for Real-Time Graphics Pipelines*

3:30–3:50 - Andrew Lauritzen, Intel

*Deferred Rendering for Current and Future Rendering Pipelines*

3:50–4:15 - Luca Fascione, WETA

Jacopo Pantaleoni, NVIDIA Research

*PantaRay: A Case Study in GPU Ray-Tracing for Movies*

4:15–4:30 - Mike Houston, AMD

*Wrapup: What's Next for Interactive Rendering Research?*



# Beyond Programmable Shading II

4:30–5:15

Panel: *What Role Will Fixed-Function Hardware Play in Future Graphics Architectures?*

Moderator: Kurt Akeley  
Microsoft Research

Panelists:

Steve Molnar, NVIDIA

David Blythe, Intel

Mike Houston, AMD

Johan Andersson, DICE

Kayvon Fatahalian, Stanford





Course webpage and slides:  
<http://bps10.idav.ucdavis.edu>