

2 Syllabus

2.1 14:00 — Opening statement (Luca Fascione, 15 min)

A short introduction to the topics in this session and to our speakers.

2.2 14:15 — Capturing and rendering the world of materials (Wenzel Jakob, 30 min)

One of the key ingredients of any realistic rendering system is a description of the way in which light interacts with objects, typically modeled via the *Bidirectional Reflectance Distribution Function* (BRDF). Unfortunately, real-world BRDF data remains extremely scarce due to the difficulty of acquiring it: a BRDF measurement requires scanning a four-dimensional domain at high resolution—an infeasibly time-consuming process.

In this talk, Wenzel will showcase the ongoing work at EPFL on assembling a large library of materials including metals, fabrics and organic substances like wood or plant leaves. The key idea to work around the curse of dimensionality is an adaptive parameterization, which automatically warps the 4D space so that most of the volume maps to “interesting” regions. Starting with a review of BRDF models and microfacet theory, Wenzel will explain the new model, as well as the optical measurement apparatus used to conduct the measurements.

2.3 14:45 — Production quality materials (Andrea Weidlich, 30 min)

Recent film productions like *Mortal Engines* or *Alita: Battle Angel* exhibit an unprecedented visual richness that was unthinkable ten years ago. One key component to achieve this is a flexible but expressive material system that is capable of reproducing the complexity of real-world materials but is still simple enough so that it can be used on a large scale. Andrea will talk about material modeling in a production path tracer in general and the constraints that come about when artistically driven decisions meet a physically plausible world. She will demonstrate how a modern layer-based material system as it can be found in Weta Digital’s in-house renderer Manuka influences design and look development decisions, and give examples of how it is used in production.

2.4 15:15 — Break (15 min)

2.5 15:30 — “Everything the Light Touches” - Rendering The Lion King (Rob Pieké, 30 min)

Not long after the success of Disney’s *The Jungle Book*, MPC Film began work on the retelling of another Disney classic: *The Lion King*. The mandate for this project was to bring realistic environments and documentary-style cinematography to the screen, requiring improvements across the board to our rendering-related technology, workflows and pipelines. In this talk, Rob will outline some of the changes to MPC’s fur rendering, improvements in outdoor environment rendering efficiency, advancements to deep image workflows and more.

2.6 16:00 — Introduction to GPU production path tracing at Digital Domain (Hanzhi Tang, 30 min)

Starting in 2016 *Digital Domain* has been testing GPU rendering, trying to see how it would integrate into the production rendering pipeline smoothly. Starting from initial qualitative tests to widespread use on *Avengers: Infinity War* to final production renders on *Captain Marvel*, *Digital Domain* built a robust GPU rendering option that sits alongside the main CPU rendering pipeline. Hanzhi Tang will present the development challenges of both hardware and software that were encountered in this implementation of this new renderer.

2.7 16:30 — Q&A with all presenters (15 min)