Geometric Acoustics

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Geometric acoustics (GA), which involves directly simulating in real-time the acoustic transfer between sound sources and listeners in a virtual space, is considered the holy grail of game audio. We present a GA method and optimizations which along with the massive parallelism of modern GPUs allows for immersive sound rendering at interactive frame-rates. We will talk specifically about optimizing the two main components of our engine: the ray-acoustic engine and the per-path head-related transfer function (HRTF) signal processing module. Special focus will be given to translating traditionally serial audio processing algorithms to the fine-grained parallel nature of the GPU.

Zuofu Cheng is a Lecturer at the University of Illinois at Urbana Champaign, Department of Electrical and Computer Engineering. He received his Ph.D. in Electrical Engineering in 2014 from the University of Illinois. His research interests are in GPU computing, sound and acoustics in gaming, game design and development, and embedded systems. He is the primary engineer behind AVIDEngine, a real-time geometric acoustic engine for video games, as well as a contributing engineer to work done in mesh optimization for simulation codes at the University of Illinois Computational Science and Engineering program.