Measurement–based Modeling for Computer Graphics

Pieter Peers, Ph.D.
Senior Researcher
Institute for Creative Technologies
University of Southern California

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Abstract

Modeling and visualizing scenes that are indistinguishable from real photographs is one of the long standing goals of computer graphics. This talk will focus on the former aspect (modeling), and in particular on appearance modeling. Appearance modeling roughly refers to the design and creation of digital representations of materials for the use in virtual scenes, and all other aspects that impact appearance during visualization. When reproducing the appearance of physical scenes, it is often more convenient to use measurements as a basis for modeling than to rely solely on artistry and manual modeling tools, due to the overwhelming amount of details present in these physical scenes. In this talk I will provide an overview of my contributions to various aspects of measurement–based modeling in computer graphics. In particular I will discuss contributions to appearance acquisition, specialized compression techniques, editing of measured appearance data, and finally the physical (re–)synthesis of appearance. A reoccurring theme in the presented research is the use of a combination of active illumination and mathematical techniques to improve specific aspects of measurement–based appearance modeling.

Biography

Pieter Peers is currently a senior researcher at the Graphics Laboratory at the University of Southern California’s (USC) Institute for Creative Technologies (ICT), and he is a Research Assistant Professor at USC’s Viterbi School of Engineering. Prior to this, he was a research assistant in the Computer Graphics Research Group at the K.U.Leuven (Belgium), where he also earned his degree in Computer Science in 2000, and a Ph.D. in Computer Science in August 2006. Pieter’s Ph.D. thesis, under the supervision of Professor Philip Dutr, focused on data–driven computer graphics, in particular on image–based relighting. Since graduating, Pieter has gradually expanded his research to cover a wider range of topics such as appearance modeling in general, facial appearance acquisition, facial and full—
body performance capture, and editing of data–driven appearance data–sets. A common theme in his research is the use of active illumination to model the appearance properties of real subjects.