

CALBaD. Computer Aided Light Based Design TIN2007-67120

Xavier Pueyo
Universitat de Girona

Abstract

The project consists of a central body (Illumination simulation) formed by three main blocks, which is oriented to the design (CAD) of active (luminaries, luminaries' distribution) or passive illumination systems and elements (windows, skylights). The results of the three blocks from this central body will be applied to environments, which will be generated in the Urban modelling block, and will take advantage of the techniques developed in the Interactive visualization block.

- **Urban modelling.** Generation of complex urban and architectural environments with GPU-based solutions. The generation of those environments will be not only interactive, but also will be based on a parametric description that allows a procedural design.
- **Illumination Simulation.** Usage of the light transport simulation and its interaction with the environment (surfaces and volumes) in different ways:
 - *Artificial Illumination.* Creation and development of inverse reflector design software tools that will allow improvements in the production process and the optimization of its luminous efficiency.
 - *Natural Illumination.* Development of efficient physically based and evaluation techniques of the natural illumination that will enable its usage in architectural and urban design projects.
 - *Assisted Illumination.* Development of software tools for illumination design from images of the environment to illuminate, or from definitions of desired illumination perceptual objectives.
- **Interactive Visualization.** Design and development of solutions, based on the exploitation of the advantages of modern GPUs, for the treatment of complex illumination systems and for obtaining high quality images, in an resolution and distance-independent manner.