

**THE IMPACT OF LIGHTING AND ROOM ACOUSTICS  
PARAMETERS ON THE PERCEIVED INTIMACY OF A  
MUSICAL PERFORMANCE**

By

Shane A. Myrbeck

An Abstract of a Thesis Submitted to the Graduate  
Faculty of Rensselaer Polytechnic Institute  
in Partial Fulfillment of the  
Requirements for the Degree of  
MASTER OF SCIENCE

Major Subject: ARCHITECTURAL SCIENCES

The original of the complete thesis is on file  
in the Rensselaer Polytechnic Institute Library

Approved:

Dr. Jonas Braasch, Thesis Adviser

Rensselaer Polytechnic Institute  
Troy, New York

June 2009  
(For Graduation August 2009)

## ABSTRACT

Crossmodal studies of the effects of visual cues on the perceived acoustics of a performance space have suggested the inextricable relationship between vision and audition. When designing a building or virtual environment for music, critical attention must be paid to a visual aesthetic to ensure a desired level of intimacy between the audience and performer. This visual aesthetic is ordinarily left entirely to the main architect or visual artist. However, given the body of research suggesting crossmodal influences on the human auditory system, it is clear that acousticians must also carefully consider the visual effects of their recommendations for acoustic improvement. The objective of this study is to establish the effects of various visual cues on audition as pertaining to intimacy in an ecological context. This study uses digital compositing (bluescreen) techniques to place a musical performance in various virtual environments, and employs real time audio-video processing to create an interactive, cross-modally immersive environment. Participant-adjusted direct-to-reverberant ratio as well as visual cues adapted from stage lighting techniques are used to establish crossmodal relationships. The ability to adjust visual cues is shown to significantly effect subjects' perception of intimate acoustic settings despite generally static acoustic cues.