

## THE SET-SPECTRUM PROJECT

By Iryna Kuksa

Published in *TD&T*, Vol. 44 No. 4 (Fall 08)

*Theatre Design & Technology*, the journal for design and production professionals in the performing arts and entertainment industry, is published four times a year by United States Institute for Theatre Technology. For information about joining USITT or to purchase back issues of *TD&T*, please contact the USITT office:

USITT  
315 South Crouse Avenue, Suite 200  
Syracuse, NY 13210  
tel: 800-93-USITT (800-938-7488)  
tel: 315-463-6463  
fax: 315-463-6525  
e-mail: [info@office.usitt.org](mailto:info@office.usitt.org)  
web: [www.usitt.org](http://www.usitt.org)

Copyright 2008 United States Institute for Theatre Technology, Inc.



# THE SET-SPECTRUM PROJECT

## SCENOGRAPHIC RECONSTRUCTION AND THEATRE EDUCATION

by Iryna Kuksa

Norman Bel Geddes (1893-1958) was a pioneer of American stage design. He was involved as author and/or designer in more than two hundred plays, theatrical performances and motion pictures. He was also a talented and successful industrial designer identified with the popular 1930s “streamlining” style in the U.S. While scholars generally agree on the historical importance of Bel Geddes’ industrial designs and widely criticize his architectural projects, his impact on theatre design is largely overlooked, or at least misjudged. In this article, I analyze Bel Geddes’ visionary ideas, working methods, and philosophy of designing for theatre, and I describe the Set-SPECTRUM project, which I co-authored. This CD-based learning system combines a computer-generated, three-dimensional (3D) reconstruction of one of Norman Bel Geddes’ most important theatrical enterprises—*The Divine Comedy* (1921) by Dante Alighieri, with analogue materials and explanatory textual information.

### Norman Bel Geddes

The New Stagecraft movement in the early twentieth century gave birth to numerous visionary scenographic projects. In Europe, Adolphe Appia and Edward Gordon Craig laid the foundation of an entirely new type of stage setting and lighting design. The strong philosophical, conceptual, and visual basis of their works had a profound impact on Norman Bel Geddes’

intention to establish himself as one of the core modernist stage designers in the United States. Originally named Norman Melancton Geddes, he transformed his name using the prefix Bel, which he borrowed from his first wife, Belle Sneider. This rather eccentric pairing served Bel Geddes well during his professional career, which extended across one of the most interesting periods of artistic and theatre history in the U.S.

Norman Bel Geddes characterized himself as a modernist-Renaissance person, attempting to combine his multiple talents in theatre and industry with radical and often futuristic visions and ideas. His ambitious and sometimes utopian approach to stage scenery and lighting technology is evident in his later productions such as *Jeanne d'Arc* (1925), *Hamlet* (1929-1931), *Lysistrata* (1930), *Dead End* (1935), and *Iron Men* (1936) in which Bel Geddes combined his set designer role with that of director and producer of the theatrical performance, establishing himself as the single interpreter of a play.

Bel Geddes' incredible productivity and his ability to combine creative thinking with technical knowledge were reflected in his designs. His futuristic concepts and desire to make the world "cleaner, safer, prettier, and better for all men" (Roberts 1979, 6) by employing advances in science and industry can be defined as "hope-giving" to the economically depressed America of that time. Together with other followers of the New Stagecraft movement, such as Lee Simonson and Robert Edmond Jones, Bel Geddes employed an expressionistic stylization which emphasized psychology and emotional states throughout the play. However, the over-complexity of Bel Geddes' concepts, frequent underestimation of the costs, and his lack of flexibility in the modification or adaptation of his sets to a particular theatrical space, resulted in a number of unaccomplished projects. These might have been some of the reasons why his contribution in the area of theatre design, highly rated at the time, has remained hardly noticed for the last few decades. Unfortu-

nately, it is true that "no scholar has judged Bel Geddes worth a monograph; and his name is barely remembered except by experts in American theatre history" (Innes, 2003).

### *The Divine Comedy*

Norman Bel Geddes defined stage design as a process for re-interpreting theatrical space and the objects within it, combining them into a structure where each part was an essential element of the main concept. He strongly believed that the only way to realize the main idea of the show was through absolute symbolism and spectacle, and that the value of design was simply "in its homogeneous integrity in giving significance to an idea and fulfilling it" (Geddes 1960, 261). Bel Geddes' designs were not only dramatically expressive but also highly technical. Similar to Craig's professional habits, Bel Geddes tended to construct large-scale models of his future sets, often encompassing the theatre buildings to accommodate them (Innes, 2003). Each of his models represented in detail every individual setting, filled with figures of actors wearing neutral costumes. His models were so precise that their exact reproduction in real-size was difficult to question. Additionally, Bel Geddes provided architectural blueprints and elevations with detailed cost estimates (which he usually exceeded). He also created many theatre adaptations and set designs that were never produced. As admitted by Bel Geddes, his most remarkable work was his production of Dante's *The Divine Comedy*. Unfortunately, his fully-functional stage model is lost.

Bel Geddes' 1921 theatrical interpretation of Dante's masterpiece was his first serious attempt to escape the obsolete two-dimensional proscenium stage. He started working on *The Divine Comedy* after designing several successful musical productions, for example *Erminie*, shown in figure 1, partly because he didn't want to be identified solely with this traditional type of theatre.



Figure 1. Norman Bel Geddes' design for the 1920 production of *Erminie*. Source: The HRC, the University of Texas in Austin.



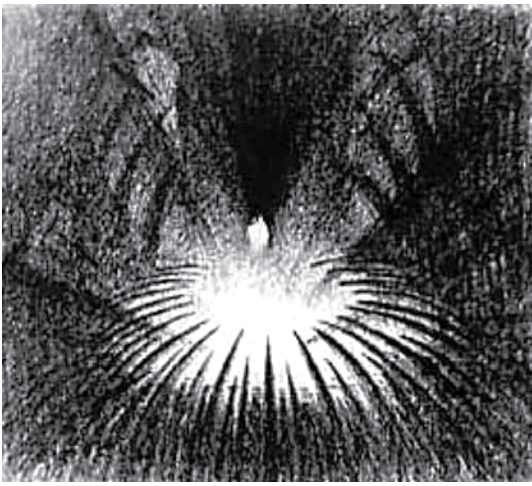


Figure 2. Norman Bel Geddes, sketches for the production of *The Divine Comedy* by Dante Alighieri, 1921. (digital photographs of the originals: The HRC, the University of Texas in Austin)

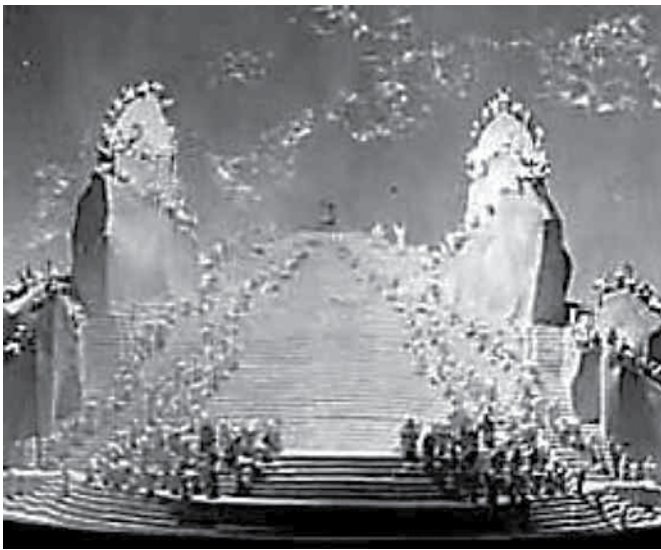


Figure 3. Francis Bruguière's photographs of Bel Geddes' set models for the production of *The Divine Comedy*. (low-resolution scans: The HRC, the University of Texas in Austin)



It was a very depressing time for him. His inability to concentrate on his work and his constant mental efforts to design something new led to a situation where his imagination, as he described it, became "overactive."

*My head was on fire, I was extremely dizzy. I staggered into the next room and opened my eyes. The room seemed a block wide. I suddenly started to fall. I clutched for some sort of support but there was nothing to grab, and I fell headlong into a bookcase. Dazed and scared, I lay still for some moments, then pulled myself to a sitting position. I discovered that I was holding a book in my right hand. I opened it and, bemusedly, read the same passage over and over again before I realized what it was.*

*"As flowerets, bent and closed by the chill of night, after the sun shines on them, straighten themselves all open on the stem, so I became with my weak virtue. And such good daring hastened to my heart, that I began like one enfranchised."*

*None other than Norton's translation of Dante's *The Divine Comedy*. (Geddes 1960, 248)*

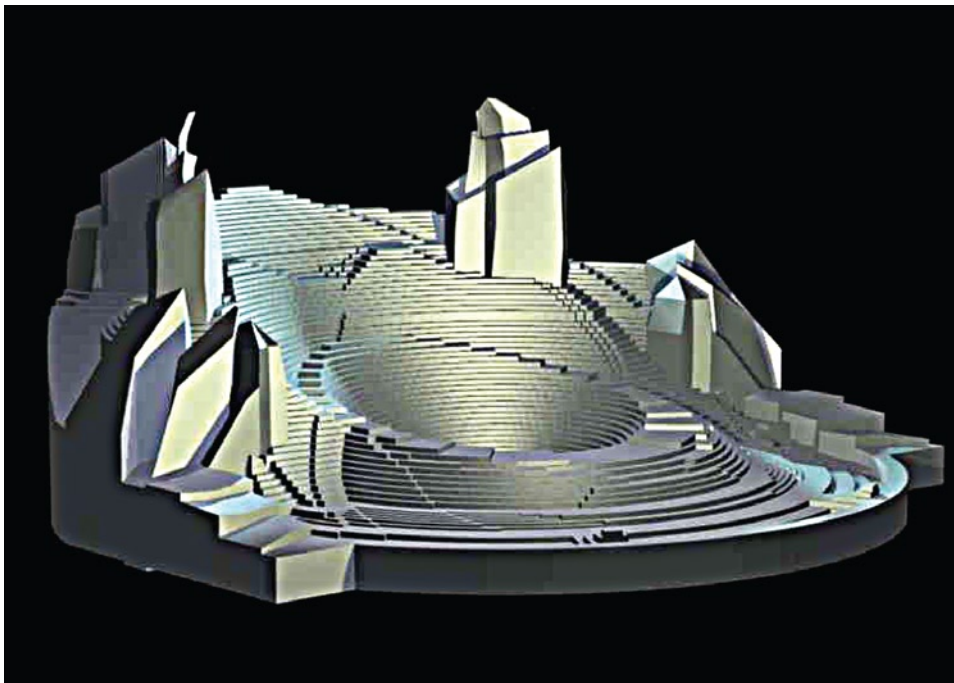


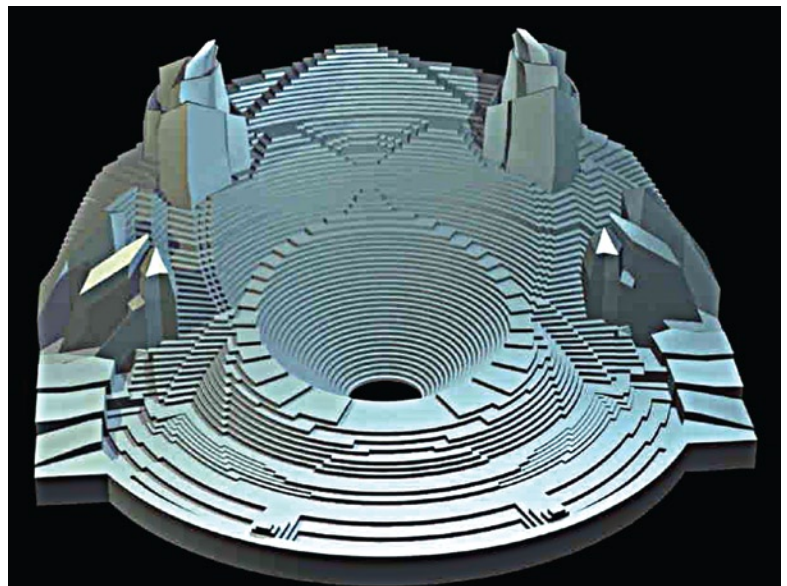
Figure 5. The 3D reconstruction of Norman Bel Geddes' set-model for *The Divine Comedy*.

Nevertheless, it was this “overactivity” that gave birth to one of the most interesting designs of the early twentieth-century American theatre.

Bel Geddes' ambitious project was intended to mark the six hundredth anniversary of Dante's death, and the author aimed to stage the play in Madison Square Garden. He also specially designed the Divine Comedy Theatre to accommodate this production and produced a set of plans for a portable stage structure, to be moved around the country and used for performances in various university auditoria and at open-air sites. Bel Geddes spent approximately two years developing a fully-functional model for *The Divine Comedy* production. Currently, his original concept exists only in the form of sketches, photographs, plans, and an annotated script.

Bel Geddes treated Norton's translation of Dante's play as a working script and after thorough preliminary work he constructed a general outline for dramatization, including the selection of scenes. Only seventeen passages were, in his opinion, suitable for visualization in theatrical space. In order to conserve the essence of Dante's vision, but at the same time ensure the continuity of the play remained unbroken, Bel Geddes arranged the *Inferno* as Act One and combined the *Purgatory* and the *Paradise* into Act Two. He produced sketches and drawings of the model while writing the script (fig. 2).

The main conceptual idea of *The Divine Comedy* project was the unification of shape, lighting, and sound. This project was an amalgamation of Bel Geddes' abstract thinking, which found its expression in stylized and exaggerated acting, and complicated designs of stage machinery, lighting,



and sound effects. The production totaled 523 actors (three principals and twenty secondary characters, each in charge of twenty-five members of the chorus). The real-life set would have measured 135 feet by 165 feet. The technological solutions for staging Bel Geddes' *The Divine Comedy* were far too advanced for the time. Fortunately, the detailed, full-scale, wooden stage-model, which survives in Francis Bruguière's excellent photographs (fig. 3), illustrate precisely every change of scene.

With the development of computer 3D visualization techniques a new realization of *The Divine Comedy* is now possible.



The main conceptual idea  
of *The Divine Comedy* project  
was the unification of shape,  
lighting and sound.

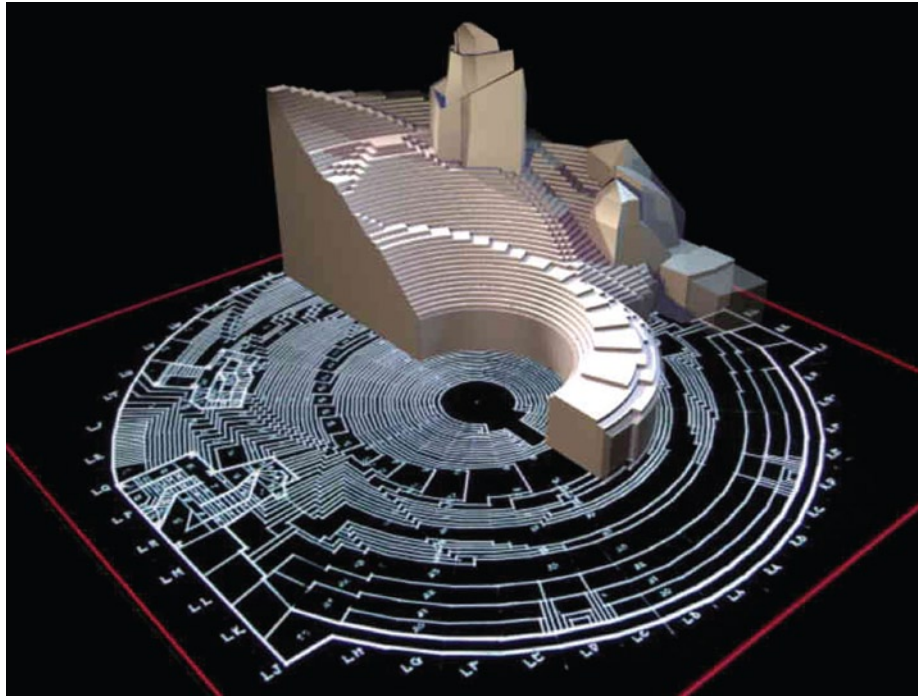
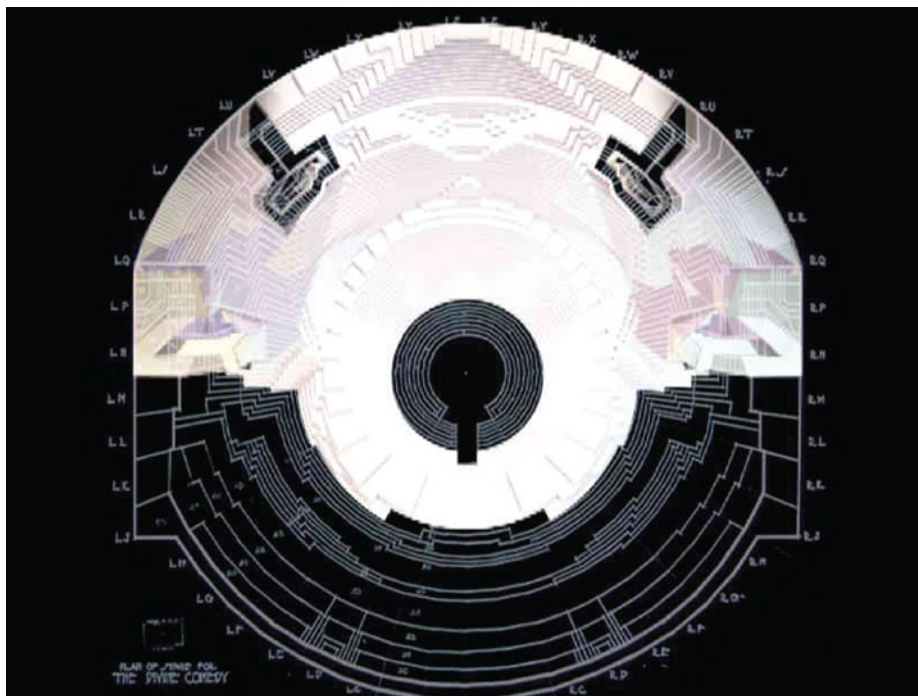


Figure 6. Two screen-shots of the 3D reconstruction process.



## The Set-SPECTRUM Project Background

New approaches to theatre education and research have already been established through the global use of digital technologies of communication. These include new modes of knowledge visualization through employing 3D modelling. This method shifts traditional modes of information delivery towards a more visually-enhanced experience. One might define performance reconstruction as the process of reviving various acting, performing, and even directing activities. Some scholars justify the need to re-create performances by calling it a lively approach to theatre research (Sarlos 1989, 200). It could be disputed, however, that the term *reconstruction* here could also mean *interpretation* or a new subjective vision of these past actions. Undoubtedly, it is not always possible to know precisely how a theatrical piece was first created and staged. Furthermore, it is similarly impossible to re-create exactly the audience's response to it, which was influenced by prevailing contemporary cultural, political, and societal values. Every performance is a creative process, which is influenced by the numerous factors determined by the time and place of staging, including the element of improvisation. This implies that no performance could be exactly the same every time it is staged or performed.

The recreation of scenographic artifacts differs from performance reconstruction in that the exact replica of the past set designs is often possible (if analogue materials are available) and sometimes crucial for scholarly analysis. In this case, the bridging between the past and the future, although not entirely objective, is as close to the original as a performance reconstruction can never be. 3D visualizations, if used together with analogue materials and explanatory textual information, can only enhance the quality of scholars' understanding.

## Project Overview

New media technologies have already proved themselves very efficient in improving the understanding of communicative qualities of set design—e.g., form, line, color. Thus, the Set-SPECTRUM project attempts to develop a novel conceptual model to support the study and research of “lost” scenographic artifacts. The effort was made to develop materials and activities specifically to arouse the aspirations of potential users to learn about Norman Bel Geddes and his visionary set design for Dante's *The Divine Comedy*. The Set-SPECTRUM project proposes an engaging approach to designing educational software which was developed through longitudinal, cross-disciplinary research. It aims to provide a long-term pedagogical impact and satisfaction for potential user-groups and to develop their visual and technical literacy and research skills. The Set-SPECTRUM project employs a new and useful vocabulary for interaction with artifacts and creativity-training, providing greater knowledge of the use of new media technologies within the classroom and the potential to explore difficult and sensitive subjects. The project has been designed to bridge research and creativity in a communicable and systematic manner, in order to allow the identification of the next stages of promoting

visually-enhanced learning. The Set-SPECTRUM is envisioned ultimately as a source of knowledge, but also as a catalyst for creating new educational and design applications and customizing the teaching curriculum in the field of theatre studies.

The main objectives of the Set-SPECTRUM project can be defined as follows: (1) fostering scholars' awareness and appreciation of Norman Bel Geddes and his theatrical presentation for *The Divine Comedy* in the evolution of the twentieth-century American theatre; (2) creating new pedagogical models applicable to learning in the twenty-first century by promoting new ways of knowledge visualization in the curriculum; (3) making appropriate use of information and communication technologies (ICT) in order to raise the levels of students' achievements and contribute to the professional development of teachers through innovative methods of knowledge presentation and delivery; and, eventually, (4) encouraging high-quality self-assessment and enabling individuals to acquire lifelong learning skills and techniques.

The Set-SPECTRUM project's content has been developed specifically for educational activities in higher education institutions, research centers, as well as the study units of theatre museums and galleries.

## The Set-SPECTRUM Structure

The Set-SPECTRUM educational package consists of nine sections: Introduction, About the Project, Norman Bel Geddes, The Divine Comedy, 3D Reconstruction, Photo Gallery, Study Corner, Structure, and Contact.

The first two sections contain creative animations which were designed to visually introduce the Set-SPECTRUM project and its central component—*The Divine Comedy* set-model—and also explain in brief the project's aims and objectives. The video clip was made in Adobe Premier 6.5 and the finished presentation was saved in AVI format.

The next part provides a brief biographical sketch written by Norman Bel Geddes. The subsections here highlight the progression of his creative career and contain some background information on the early twentieth-century New Stagecraft movement in Europe and North America, placing Norman Bel Geddes within the historical settings.

The section devoted to *The Divine Comedy* project analyzes the overall concept of this theatrical enterprise and some background information is provided on the conception of this exceptional modernist stage design. Furthermore, a number of possible reasons are examined for why Bel Geddes' *The Divine Comedy* has never been staged, followed by a discussion of how a staging of the play on the intended set might have affected the overall flow of the performance. Here, the first 3D computer-generated model of Bel Geddes' *The Divine Comedy* (fig. 5) is introduced and an illustrated process of 3D reconstruction of the set-model is outlined.

In the next part, the whole process of 3D digital reconstruction is presented as a video clip, giving viewers a sophisticated tool to observe this dynamic process in intricate detail

# By designing the **Set-Spectrum** project, I aimed to answer the question of how **new media technology can help** in cultural heritage research...

(fig. 6). Windows Media Player is used for playing this animation in a separate window, allowing users to slow down play-time, apply slow motion or step-frame facilities, and also re-play the animation option. The Interaction subsection gives the viewers a further opportunity to interact with the 3D model. Here, all necessary information is given on how to navigate the model and interact with the lighting, using various window controls. Direct 3D 9.0 Library was used to render 3D graphics for the digital stage-model, control the lighting, and navigate the cameras (fig. 7). The 3D programming for the set-model navigation has been conducted in IDE (Integrated Development Environment) Visual Studio 2005, using C Sharp object-oriented programming language. It was decided to employ a flexible text format Extensible Markup Language (XML) for creating and storing three sources of lighting, which users can employ creatively for illuminating the 3D stage-model from various viewpoints. In order to run the 3D navigation option, it is necessary to have Net.Framework V2.0 installed.

The Photo Gallery allows the users to look at the 2D and 3D imagery in retrospective, following the process of creation of *The Divine Comedy* design from the early sketches to the computer-generated model (fig. 9).

The Study Corner section aims to boost creative thinking, research, and analysis activities, encouraging students to share their thoughts about the subject and empowering them to see themselves as active and necessary participants in their own learning. It is designed to facilitate learners' peer discussions and promote conceptual development and meaning-making in the domain of theatre design. The Quiz part is a diagnostic instrument for assessing students' conceptual understanding and knowledge of the subject. Learners make their predictions using a multiple-choice format with the correct answers given at the end. In addition, a list of a selection of academic sources used in the project is provided here. Finally, the Contact and Structure parts contain the contact information for the author of the project and her collaborators and an outline of how the Set-SPECTRUM is organized for easy browsing.

Microsoft PowerPoint 2003 was used for assembling and presenting the Set-SPECTRUM project as a coherent whole. For the last few years, this computer program has become the dominant presentation tool, especially in the educational world. It is expected that many potential users of the Set-SPECTRUM project would already be familiar with Microsoft PowerPoint or they

would be able to learn and start using the project's materials reasonably fast.

## Pilot Testing and Evaluation

In order to assess the accessibility and overall effectiveness of the Set-SPECTRUM project in visually enhanced knowledge delivery, an anonymous survey was undertaken at the University of Warwick (U.K.) and given to the MA International Design and Communication Management students on November 29, 2006. This pilot testing was performed under the Visual Analysis and Interpretation module as a Design Evaluation practical exercise, which is an important part of this MA's curriculum. Fifteen students were divided into three groups of five people. Although there were certain limitations to this research activity—e.g., the small number of the participants and their affiliation with the Set-SPECTRUM project's author as a module leader—the results of the evaluation were encouraging.

All students agreed upon the clarity and informativity of the project's content and the consistency of its format. Only one respondent was undecided about the ease of interacting with the project's resources and navigation through its content, while the rest confirmed that it was fairly straightforward. The majority of participants (87%) reported that it was simple to navigate the 3D set-model, especially after reading the Help section's explanations. Fourteen students (one was undecided) found the Set-SPECTRUM project's visual presentation techniques crucial for the understanding of the essential elements of *The Divine Comedy* set design. An unexpected result of this survey was that one third of the students were undecided about whether the Quiz section is a necessary part of this project. They generally agreed upon the usefulness of the Discussion Questions section, but found the Quiz part rather tedious. At the end, however, all participants expressed strong interest in using similar innovative computer-based products for educational purposes.

The results of this survey indicated the genuine interest of the students in the new modes of learning introduced by the Set-SPECTRUM project. Certainly, it is unreasonable to assume that the above data are representative, because a convenience sampling method (Gillham 2000, 18) was used for the expediency of this research, in order to acquire a gross estimate of the results. It should be noted, however, that this approach is widely applied by many researchers to collect valuable information especially in a pilot study, therefore, it was found very useful and even necessary for this particular case.

## Concluding Remarks

The visualization of knowledge using new media technologies is a principal factor for advancing theatre education and research practices. As there is little previous work, addressing the problem of employing the technologies of computation as a tool for the reconstruction of "lost" scenographic artifacts and simultaneously as a knowledge delivery, research and creative platform appears to exist, there is a strong need to concentrate



# The visualization of knowledge

using new media technologies is a principal factor for advancing theatre education and research practices.

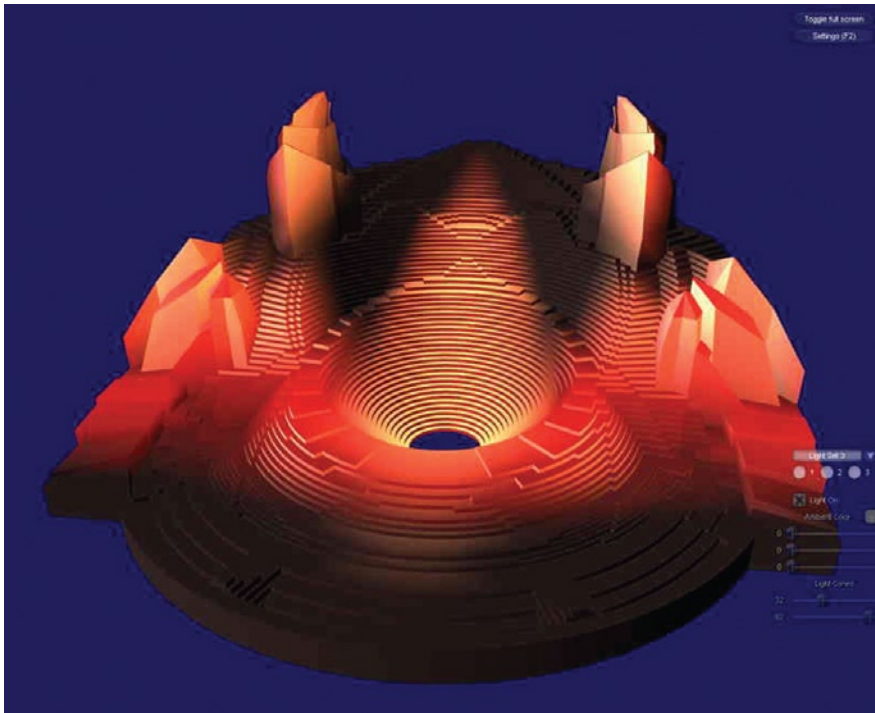
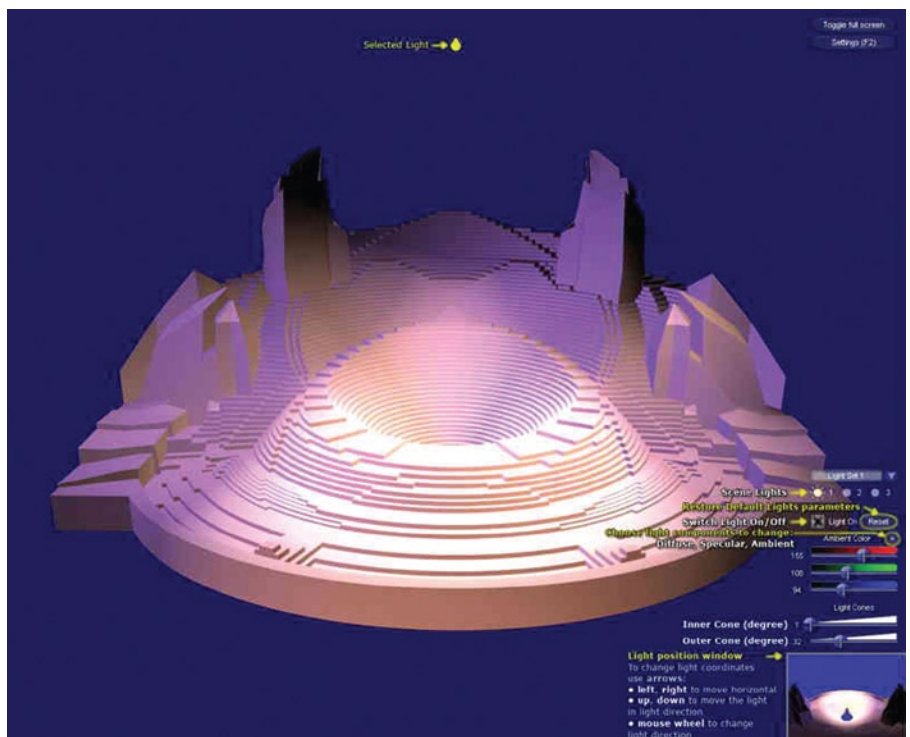


Figure 7. Screen-shots of the Interaction subsection.



on this niche. My research uncovered the need to integrate Norman Bel Geddes' contribution into our understanding of modernist theatre history and within core educational curricula. By designing the Set-SPECTRUM project, I aimed to answer the question of how new media technology can help in cultural heritage research—its production, storage and transfer. By applying 3D visualization techniques as a methodological practice, I seek to transform the ways to study the complicated structure of *The Divine Comedy* set, strongly drawing upon the original visual resources. The Set-SPECTRUM project attempts to forge a middle ground between the present and the past of this extraordinary stage-construction. While the project seeks to be comprehensive, it does not intend to be exhaustive or conclusive. Presented in a flexible digital format, it is open for further development.

## Acknowledgements

The research for this paper was conducted at the Harry Ransom Humanities Research Centre (HRC) in the University of Texas at Austin in the USA. I extracted original data on Norman Bel Geddes and *The Divine Comedy* from Industrial Design and Theater Files, 1873-1964 (bulk 1915-1958) and Personal Files 1870-1959 (bulk 1930-1958). The Set-SPECTRUM project was created in collaboration with Eugeniya Kareva and Sergej Salnikov.

All the data used in this paper, including photographs, plans, drawings, and elevations, was extracted from original sources according to the HRC guidelines. ❖

**Dr. Iryna Kuksa** is a research fellow in *Interactive Arts in the College of Art and Design, Nottingham Trent University* and a visiting lecturer in the *School of Theatre and Performance Studies, University of Warwick, UK*. She explores the role of multimedia in the field of theatre studies and cultural heritage research, investigating how novel methodologies, including 3D reconstruction of historical artifacts, can be applied to pedagogical practices.

## Sources Cited

Geddes, N. B. 1960. *Miracle in the Evening: an Autobiography by Norman Bel Geddes*. Edited by Kelley, W. New York: Doubleday & Co, Inc.

Gillham, B. 2000. *Developing a Questionnaire*. London: Continuum.

Innes, C. 2003. *Theory, Practice and Modern Drama*. Available online at [http://moderndrama.ca/crc/resources/essays/theories\\_of\\_drama.php](http://moderndrama.ca/crc/resources/essays/theories_of_drama.php).

Roberst, J. D. 1979. *Norman Bel Geddes: An Exhibition of Theatrical and Industrial Designs*. Austin: Univ. of Texas Press.

Sarlos, R. K. 1989. "Performance Reconstruction: the Vital Link between Past and Future" in Postlewait, T. and B. McConachie, eds. *Interpreting the Theatrical Past: Essays in the Historiography of Performance*. Iowa City: University of Iowa Press.