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Jean-Claude Heudin (Ed.)

# Virtual Worlds

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Proceedings



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## Preface

Virtual Worlds 2000 is the second in a series of international scientific conferences on virtual worlds held at the International Institute of Multimedia in Paris - La Défense (Pôle Universitaire Léonard de Vinci).

The term "virtual worlds" generally refers to virtual reality applications or experiences. We extend the use of these terms to describe experiments that deal with the idea of synthesizing digital worlds on computers. Thus, virtual worlds could be defined as the study of computer programs that implement digital worlds. Constructing such complex artificial worlds seems to be extremely difficult to do in any sort of complete and realistic manner. Such a new discipline must benefit from a large amount of work in various fields: virtual reality and advanced computer graphics, artificial life and evolutionary computation, simulation of physical systems, and more. Whereas virtual reality has largely concerned itself with the design of 3D immersive graphical spaces, and artificial life with the simulation of living organisms, the field of virtual worlds, is concerned with the synthesis of digital universes considered as wholes, with their own "physical" and "biological" laws.

Besides its applications in simulation, computer games, on-line business, etc, this approach is something broader and more fundamental. Throughout the natural world, at any scale, from particles to galaxies, one can observe phenomena of great complexity. Research done in traditional sciences such as biology and physics has shown that components of complex systems are quite simple. It is now a crucial problem to elucidate the universal principles by which large numbers of simple components, acting together, can self-organize and produce the complexity observed in our universe. Therefore, virtual worlds is also concerned with the formal basis of synthetic universes. In this framework, it offers a new and promising approach for studying complexity.

This, the second Virtual Worlds conference, has confirmed the interest of the scientific community in this new trend of research and applications. Unlike the first one, this conference was organized as a single thread of presentations. This was decided in order to catalyze discussions and information exchanges between speakers and other participants during the conference. As a consequence, the selection level was higher than two years ago and only a reduced set of the submitted papers were finally accepted. The approaches and works covered by the resulting program is rich and diverse. It reflects the impact that this new trend of research has on the scientific community.

As expected, the production of these proceedings was a major task, involving all the authors and reviewers. As the editor, I have managed the proceedings in a classical way. Every contribution that was accepted for presentation at the conference is in the proceedings. The program committee felt that these papers represented mature work of a level suitable for being recorded, some of them requiring modifications to be definitively accepted.

Besides the classical goal of a proceedings volume, the idea was to recapture in print the stimulating mix of ideas and works that were presented. Therefore, the papers are organized to reflect their presentation at the conference. The material covered

is diverse and falls naturally into a number of categories: virtual worlds communities and applications, virtual worlds technologies and tools, virtual humans and avatars, art and virtual worlds, artificial life and complex systems, virtual reality and interfaces. This collection of papers constitutes a good sample of works that appear necessary to achieve the goal of synthesizing virtual worlds. My wish is that the reader will find in this volume many motivating and enlightening ideas that will help him to contribute to the new and fascinating field of virtual worlds.

## Acknowledgments

Many people and groups contributed to the success of the conference. My sincere thanks go out to all of them. I would first like to thank all the distinguished authors that contributed to this volume. The committee which selected the papers included the editor along with :

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May 2000

Jean-Claude Heudin

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