Introduction

The Singularity School and Conference was organized from 24 January to 25 February 2005, in the CIRM, Centre International de Rencontres Mathématiques de Luminy, Marseille, France, as a Special School of the Formation Permanente of the French CNRS. Organizers of the five weeks were successively Anne Pichon, Jean-Paul Brasselet, David Trotman, Nicolas Dutertre and Claudio Murolo, Denis Chéniot. Around 200 mathematicians from 31 countries participated in this very successful event.

The five weeks were organized in the following way : Elementary and advanced courses were given during the first week by high level specialists of the subject : Jean-Paul Brasselet, *Characteristic classes for Singular Varieties*, Herwig Hauser, *Basic techniques for resolution of singularities*, Anatoly Libgober, *Topology of the complements to hypersurfaces in projective space*, David Trotman, *Stratifications of subanalytic and semialgebraic sets*, Vladimir Zakalyukin, *Lagrangian and Legendrian singularities*. The second week was devoted to general lectures on singularity theory. During the third week users of singularity theory gave lectures on applications of the theory to various domains: robot manipulation, visualization techniques, medical imaging, nerve cells, resonance tongues, gravitational lensing, etc. . . During the fourth week young researchers explained their recent results and during the last week lectures were concentrated on geometry and topology in singularity theory.

The purpose of the event was to cover recent developments in the area and to introduce young researchers to singularities in geometry and topology.

The book is a collection of courses, surveys and new results in singularity theory and its applications presented during the five weeks. It provides a focus for senior researchers and postgraduate students, summarizing the current main ideas in singularity theory and suggesting future research directions in the area.

The main interesting features of the papers presented for the Proceedings of the Singularity School and Conference are: the elementary and advanced courses in the first part of the book, and the papers on applications of singularity theory in the second part, which is an original point in comparison with classical proceedings on the subject. The third part contains surveys providing development and evolution of the most important themes of the theory from the beginning up to now, and research papers on important recent results in the field. They represent the current problems under investigation

in the area and the present state of the art of the subject.

All papers published in the present book have been refereed.

The volume is complementary to the volume published by World Scientific Publishing for the School and Workshop on Singularity theory held in Trieste, 15 August - 3 September 2005.

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It is a great pleasure to thank all the speakers and the participants whose presence was the real success of the School and Conference. We are also very grateful to the staff of the IML and the CIRM for their help in organizing the event. Finally, our thanks go to the editorial staff of World Scientific Publishers for their patience and efficient help with publication process of the volume.