Preface

Obviously it is possible to practice pure mathematics without any interest in its applications. There are people convinced that applications might be even dangerous for the purity of mathematical research. However there is also another, very important, tradition in science going back to Archimedes, Newton and Gauss. In this tradition mathematics is considered the language of nature and, by straightforward feedback, applications are the source of fresh ideas for mathematics itself. Singularity theory is considered to be a relatively recent branch of mathematics—it "grew out of the work of Hassler Whitney and René Thom in the 1950s and 1960s, with crucial input from Bernard Malgrange and John Mather who put so many of Thom's beautiful ideas on a sound mathematical footing"[1]. Nevertheless singularity theory has been extensively developed in the applications tradition for more than a half century. Its deep and intriguing results are considered to be extremely interesting and stimulating for interdisciplinary research. There has been fundamental progress in optics, image recognition and processing, control theory, mechanics, relativity theory and numerous other fields of study, including those pertaining to biological, medical and social sciences. New singularity theory methods and techniques for solving theoretical and practical problems are being developed all the time.

With the aim of exploring the current and potential areas of creative interaction between singularity theory and other mathematical disciplines, and of fostering active exchange of ideas among people with different scientific backgrounds, a series of workshops on *Singularities in Generic Geometry and Applications* was proposed by Carmen Romero-Fuster and the first workshop was organized in Spain in Valencia in 2009. The success of this workshop was evident and the need for such a biennial feast of this most fresh and creative branch of mathematics became obvious. As a result, the second workshop on singularities in geometry and applications was organized at the Banach Center in Poland. The workshop brought together in Będlewo, Poland, more than eighty outstanding mathematicians from fourteen countries. The plenary lectures were as follows:

- Jean-Paul Brasselet (Some insights on the Euler local obstruction),
- James Damon (Medial/skeletal linking structures and the geometry of multi-object configurations),
- Peter Donelan (Singularities of robot manipulators: Lie groups and exponential products)
- Andrew du Plessis (Stable unfoldings of map-germs on singular varieties),
- Peter Giblin (In Memoriam Ian R. Porteous 9 October 1930 – 30 January 2011) ,
- Victor Goryunov (Local invariants of maps between 3-manifolds),
- Goo Ishikawa (Singularities of tangent varieties to curves and surfaces),
- Maxim Kazarian (Stabilization of cohomology classes represented by singularity loci)
- Isabel Labouriau (The geometry of fast and slow dynamics in nerve impulse),
- Walter Neumann (Local bilipschitz geometry of complex surfaces),
- Juan Jose Nuño-Ballesteros (Topological $\mathcal{K}$-equivalence of map germs),
- Kentaro Saji (Geometry of wavefronts),
- Federico Sánchez-Bringas (Geometric invariants on Lorentzian surfaces immersed in Minkowski $\mathbb{R}^{3,1}$),

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[1] Preface to the Proceedings of the First Workshop on Singularities in Generic Geometry and Applications, Valencia 2009, *Topology and its Applications* **159**, issue 2, 2012

- Zbigniew Szafraniec (Quadric forms and intersection numbers for polynomial immersions),
- Farid Tari (Umbilics of surfaces in the Minkowski 3-space),
- Stephen Yau (New invariants for complex manifolds and its application to complex Plateau problem),
- Michail Zhitomirskii (Normal forms in singularity theory versus differential geometry).

The minicourses were as follows:

- Carmen Romero Fuster (Singularity theory techniques in extrinsic geometry),
- Farid Tari and Alexey Davydov (Singularity theory of implicit differential equations).

Many of the lecturers have now presented their new results in a written form. We are very grateful to the editors of the Journal of Singularities for making possible this special issue containing some of the tangible outcomes of the conference in Będlewo.

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