

## PREFACE

M. M. Postnikov (October 27, 1927–May 27, 2004) was one of the most influential Russian topologists of the 20th century, and the inventor of a fundamental construction in algebraic topology—the Postnikov system. He is also well known as one of the creators of the Moscow School of Algebraic Topology; among his many PhD students was the Fields Medalist S. P. Novikov.

The conference *Algebraic topology: old and new* was held at the Stefan Banach International Mathematical Center in Będlewo, Poland, June 18–24, 2007 to commemorate M. M. Postnikov’s mathematical achievements and his 80th birthday.

The scientific program of the conference covered a wide area of Geometry and Topology, reflecting the impact of M. M. Postnikov and his work. The conference brought together over one hundred geometers and topologists from Argentina, Austria, Canada, the Czech Republic, Denmark, France, Georgia, Germany, Great Britain, Hungary, Israel, Italy, Japan, Jordan, Mexico, Poland, Romania, Russia, Serbia, Spain, Sweden, Ukraine and USA. The work of the conference was organized in four sections:

- 1) Homotopy theory,
- 2) Topology of manifolds,
- 3) Low-dimensional topology,
- 4) Lusternik–Schnirelmann theory.

The conference opened with a plenary talk by Dennis Sullivan dedicated to modern applications of the Postnikov systems in geometry. Among the topics in the homotopy theory section were operads, generalized homology, and Massey products. A special emphasis was put on string topology. The topology of manifolds section included talks on fixed point theory, higher-dimensional knots and links, and singularity theory. The section on low-dimensional topology focused on gauge theory, Floer theory, and the twisted invariants of knots and manifolds.

The initiative of organizing the conference was taken by Dan Burghelea and Andrei Pajitnov in 2005. Bogdan Bojarski, the Director of the Stefan Banach International Mathematical Center, supported the project from the very beginning. The contribution of Haynes Miller to the organizing of the conference, and to the shaping of the program of the homotopy theory section, was truly invaluable. The program of the conference was decided upon during active discussions among Dan Burghelea, Ralph Cohen, Marek Golasieński, Toshitake Kohno, Haynes Miller, Aleksander Mishchenko, Andrei Pajitnov,

Krzysztof Pawałowski, Andrew Ranicki, Yuli Rudyak, and Nikolai Saveliev. The local organizational work was done by Marek Golański with the help of Zbigniew Błaszczak. The assistance of Victor Buchstaber and Arkady Maltsev is also greatly appreciated.

The contributions to this volume are based on talks delivered at the conference. We open the volume with a talk by Yuli Rudyak, *M. M. Postnikov: his life, work and legacy*, which includes a list of Postnikov's publications. It is followed by the participants' contributions, divided into two sections: Geometric Topology and Homotopy Theory. We have also included the list of participants and the scientific program of the conference.

The conference was organized by the Stefan Banach International Center in collaboration with the Steklov Mathematical Institute of the Russian Academy of Sciences and the Nicolaus Copernicus University in Toruń, Poland. We received financial support from the Stefan Banach International Mathematical Center, the Mathematical Institute of the Polish Academy of Sciences, the Nicolaus Copernicus University, the Russian Academy of Sciences, the Russian Foundation for Basic Research, and the Japan Society for the Promotion of Science. Substantial financial support was moreover provided by the US National Science Foundation.

It is a great pleasure to acknowledge the hospitality of the Stefan Banach International Mathematical Center and the support of its administrative team. We are grateful to the numerous institutions for their help in organizing the conference and for their financial support. We wish to thank all the participants of the conference, and in particular the contributors to this volume, for making the conference a fruitful and enjoyable event and this collection of articles a valuable resource.

*The Editors*