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Edited by Steven C. Ferry, Andrew Ranicki and Jonathan Rosenberg

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# Novikov Conjectures, Index Theorems and Rigidity

Volume 1

Oberwolfach 1993

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Jonathan Rosenberg

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*To Sergei P. Novikov*  
with respect and admiration

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## Preface

These volumes grew out of the conference which we organized at the Mathematisches Forschungsinstitut Oberwolfach in September, 1993, on the subject of “Novikov conjectures, index theorems and rigidity.” The aim of the meeting was to examine the Novikov conjecture, one of the central problems of the topology of manifolds, along with the vast assortment of refinements, generalizations, and analogues of the conjecture which have proliferated over the last 25 years. There were 38 participants, coming from Australia, Canada, France, Germany, Great Britain, Hong Kong, Poland, Russia, Switzerland, and the United States, with interests in topology, analysis, and geometry. What made the meeting unusual were both its interdisciplinary scope and the lively and constructive interaction of experts from very different fields of mathematics. The success of the meeting led us to try to capture its spirit in print, and these two volumes are the result.

It was not our intention to produce the usual sort of conference proceedings volume consisting of research announcements by the participants. There are enough such tomes gathering dust on library shelves. Instead, we have hoped to capture a snapshot of the status of work on the Novikov conjecture and related topics, now that the subject is about 25 years old. We have also tried to produce volumes which will be helpful to beginners in the area (especially graduate students), and also to those working in some aspect of the subject who want to understand the connection between what they are doing and what is going on in other fields. Accordingly, we have included here :

- (a) a fairly detailed historical survey of the Novikov conjecture, including an annotated reprint of the original statement (both in the original Russian and in English translation), and a reasonably complete bibliography of the subsequent developments;
- (b) the texts of hitherto unpublished classic papers by Milnor, Browder, and Kasparov relevant to the Novikov conjecture, which are known to the experts but hard for the uninitiated to locate;
- (c) several papers (Ferry, Ferry-Weinberger, Ranicki, Rosenberg) which, while they present some new work, also attempt to survey aspects of the subject; and
- (d) research papers which reflect the wide range of current techniques used to attack the Novikov conjecture: geometry, analysis, topology, algebra, . . . .

All the research papers have been refereed.

We hope that the reader will find the two volumes worthwhile, not merely as a technical reference tool, but also as stimulating reading to be browsed



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through at leisure.

We should like to thank the Director and staff of the Mathematisches Institut Oberwolfach for their expert logistical help, for their financial support, and for the marvellous working environment that made possible the 1993 conference that got this project started. Thanks are due as well to all the participants at the meeting, to the contributors to the two volumes, to the referees of the research papers, to the contributors to the problem list and bibliography, and to Roger Astley and David Tranah of Cambridge University Press. We thank the National Science Foundation of the U. S. for its support under grants DMS 90-03746, DMS-93-05758 and DMS 92-25063, the European Union for its support via the *K*-theory Initiative under Science Plan SCI-CT91-0756, as well as the Centenary Fund of the Edinburgh Mathematical Society.

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