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Foreword

by John Kingman, President of the European Mathematical Society

It was my privilege to welcome participants to the Fourth European Congress of Mathematics, and to thank Ari Laptev and his team for all the hard work in preparation for it. Their efforts were rewarded by the attendance, from across Europe and beyond, and by the successful programme of talks on all aspects of mathematics and its applications. It is clear that European mathematics is moving forward fast, making an impressive contribution to the world scene.

This is important, not just because mathematics is worthwhile in itself, but because it underpins all modern science and technology. If we want to exploit the discoveries of science for the benefit of the human race, if we want to make Europe competitive in the global market, we must develop the talents of our young people so that they can use mathematics with confidence and discernment. The challenges of the twenty first century will demand new mathematics and new skills in applying mathematics.

John Kingman and Tuulikki Makelainen
looking after the EMS stand

It was immensely encouraging to hear of the achievements of the young mathematicians awarded EMS Prizes during the Congress. They show the originality and liveliness that augur so well for the future progress of the subject. We congratulate them, and their many colleagues who narrowly missed winning the Prizes, and look forward to their future contributions.

Most mathematicians are motivated by the sheer joy of mathematical discovery, whether or not their results find immediate application. We should not apologise for pursuing research that we enjoy, because future use of new mathematics is always unpredictable. There is no sharp dividing line between pure and applied mathematics, much mathematics is 'not yet applied', and many of the advances announced in Stockholm will surely bear surprising fruit in future years.

I therefore commend to those who were not fortunate enough to be in Stockholm, and those who were but welcome a permanent record, this collection of so much that is best in mathematics today. Please enjoy it.

Opening speech of Ari Laptev,
President of the 4ECM Organization Committee

On behalf of the Organizing Committee, I would like to say how happy we are to welcome you here today, in Stockholm, for the 4th European Congress of Mathematics.

The European Congresses of Mathematics are a very new tradition compared to the International Congresses of Mathematics, which have existed since 1897.

Our congress took place for the first time in Paris in 1992, followed 4 years later by one in Budapest and, most recently, in Barcelona in 2000. However, it has already established itself as a major mathematical event within Europe.

This time Stockholm, somewhat inadvertently, became the host city for the 4ECM. It has been arranged by the Royal Institute of Technology in collaboration with Stockholm University. Much preparation was well coordinated with the European Mathematical Society's Executive Committee and I am also indebted to the members of the 3ECM Organizing Committee for their invaluable advice.

This event would not have been possible without the generous financial support from a number of Swedish and International institutions to whom we are extremely grateful and who are listed on the screen.

I would like to thank the members of the Scientific Committee chaired by Prof. Lennart Carleson who, together with his Vice President Björn Engquist and other members of the Committee, has designed such an excellent programme. We very much appreciate the excellent work of the Prize Committee who accepted the difficult task of choosing 10 talented young mathematicians. The members of the Prize Committee and the prize winners will be announced in the second half of the opening ceremony.

Stockholm, view from the City Hall

I am also most grateful to my colleagues who shared with me the overwhelming responsibility of organizing this event. We have endeavoured to plan every detail of our programme, and we are delighted that so far our request regarding good weather was granted.

Finally, I wish to express my gratitude to all of you who have come here to share and contribute to these 5 days of diverse mathematical lectures. I hope you will have an informative and inspiring visit, during which you will not only experience the beauty of mathematics but also the beauty of Stockholm and its archipelago.

Opening speech of Ari Laptev

Ari Laptev and Nina Uraltseva in front of the lecture hall.

Scientific Report by Ari Laptev,
President of the 4ECM Organization Committee

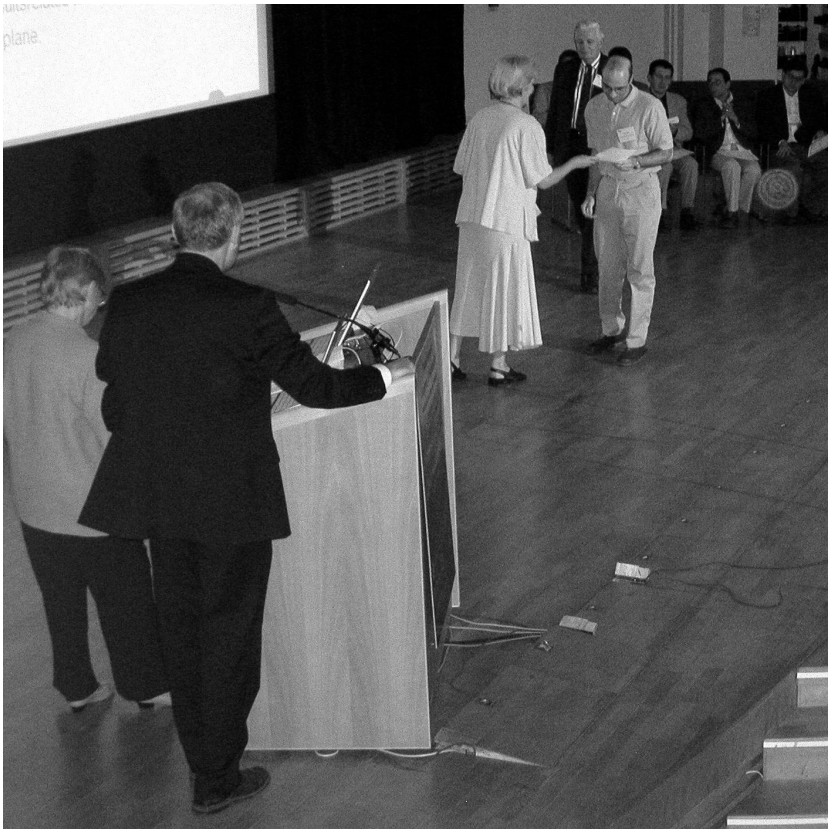
Every four years, the European Mathematical Society (EMS) organizes a European Congress of Mathematics. The purpose of this major event of European Mathematics is threefold: to present various new aspects of Pure and Applied Mathematics to a wide audience; to provide a forum for discussion of the relationship between mathematics and society in Europe; to enhance cooperation among mathematicians from all European countries.

The Fourth European Congress of Mathematics (4ECM) took place in Stockholm, Sweden, June 27 to July 2, 2004 with 913 participants from 65 countries. 200 grants were awarded to mathematicians from Central and Eastern Countries covering their travelling, lodging and living expenses. It was the major international mathematical event of the year 2004. The theme of the Congress was "Mathematics in Science and Technology".

There were seven Plenary Lectures, thirty three Invited Lectures, twelve European Network Lectures, six Science Lectures and 322 poster presentations covering all areas of mathematics and many areas of its applications.

One of the novelties of the 4ECM were so-called "Science Lectures", where the most relevant aspects of mathematics in science and technology were discussed. The following speakers gave lectures: Michael Berry (UK), Richard R. Ernst (Switzerland, Nobel Prize in Chemistry 1991), Walter Kohn (USA, Nobel Prize in Chemistry 1998), Martin Nowak (USA), George Oster (USA) and Alexsander Polyakov (USA).

Another novelty were presentations of the EU Research Training Networks in Mathematics and Information Sciences and Programmes from European Science Foundation (ESF) in Physical and Engineering Sciences (PESC). Twelve EU Research Training Networks and PESC projects from Brussels and Strasbourg have been chosen by the Scientific Committee.



Prize Ceremony

Getting ready for the 5ECM in Amsterdam

Prize Winners

There were ten EMS Prizes of 5.000 Euro each to young European mathematicians who have made a particular contribution to the progress of mathematics. Prize winners are: Franck Barthe (France), Stefano Bianchini (Italy), Paul Biran (Israel), Elon Lindenstrauss (USA & Israel), Andrei Okounkov (USA & Russia), Sylvia Serfaty (USA & France), Stanislav Smirnov (Switzerland, Sweden & Russia), Xavier Tolsa (Spain), Warwick Tucker (Sweden) and Otmar Venjakob (Germany). Five of the prize winners were independently chosen by the 4ECM Scientific Committee as Plenary or Invited Speakers. Five other prize winners gave their lectures in parallel sessions.

At the 4ECM Prize Ceremony the Carl-Erik Fröberg Prize of 30.000 sek was awarded to Anna-Karin Tornberg for her contribution to solving problems with several phases or discontinuous materials with finite element methods. She was one of the Invited Speakers at the 4ECM.

Summary

A number of lectures and poster presentations devoted to different applications of modern mathematics allows us to conclude that the Fourth European Congress of Mathematics in Stockholm substantially contributed to developing a close cooperation between pure and applied mathematicians.

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