



The Abdus Salam  
International Centre for Theoretical Physics



## SUMMER SCHOOL AND ADVANCED WORKSHOP ON TRENDS AND DEVELOPMENTS IN LINEAR ALGEBRA

22 June - 10 July 2009

ICTP, Miramare - Trieste, Italy

The Abdus Salam International Centre for Theoretical Physics (ICTP) is organizing a **Summer School and Advanced Workshop on Trends and Developments in Linear Algebra**, to be held from 22 June to 10 July 2009, in Trieste, Italy. The activity will be directed by R. Bhatia (Indian Statistical Institute, New Delhi, India), J. Holbrook (University of Guelph, Ontario, Canada) and S. Serra Capizzano (University of Insubria, Como, Italy).

A good understanding of linear algebra is essential for research in almost all areas of mathematics. It also forms the core of research in several modern applications, two of which are high speed computations and quantum information theory. Efficient methods for handling large matrices lie at the heart of fast algorithms for retrieval of data and information. Problems in quantum information and quantum computing often reduce to analysis of matrices and matrix inequalities.

The aim of the School and the Workshop is to introduce young mathematicians, especially from developing countries, to some fundamental techniques and recent developments in these topics.

### Main Topics

Canonical forms and decompositions  
Applications of Fourier analysis  
Positivity  
The internet and data mining  
Krylov methods  
The fast Fourier transform  
Quantum information theory

The first and second week (22 June - 3 July) will be devoted to a School.

The third week (6 July - 10 July) will consist of an advanced Workshop where several speakers will present current research.

### Participation

Mathematicians from all countries that are members of the UN, UNESCO or IAEA may attend the School. Although the main purpose of ICTP is to help researchers from developing nations through a program of training activities within the framework of international cooperation, students and scientists from developed countries are also welcome to attend. As the activity will be conducted in English, participants must have an adequate working knowledge of that language.

As a rule, travel and subsistence expenses of the participants are borne by their home institutions. However, limited funds are available for some participants from, and working in, developing countries, not more than 45 years of age, to be selected by the Organizers. **Such financial support is available only for those who attend the entire activity.** Every effort should be made by candidates to secure support for their fare (or at least half-fare) from their home country. **There is no registration fee to attend the school.**

**The closing date for receipt of requests for participation is 15 January 2009.**

Interested Participants should fill in and submit the **Online Application Form** that can be found at: <http://agenda.ictp.it/smr.php?2044>. Kindly also attach a Curriculum Vitae (for junior applicants a recommendation letter from their supervisor is also requested). Please upload all file attachments in PDF format.

Secretariat:

SMR 2044 - Summer School and Advanced Workshop on Trends and Developments in Linear Algebra, c/o Ms. K. Mabilo

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<http://agenda.ictp.it/smr.php?2044>

ICTP Home Page: <http://www.ictp.it>

### Directors

R. Bhatia (India)

J. Holbrook (Canada)

S. Serra Capizzano (Italy)

### Local Organizer

R. Ramakrishnan  
ICTP, Trieste, Italy

### Lecturers at the School

Rajendra Bhatia (India)  
Lars Elden (Sweden)  
David Kribs (Canada)  
John Holbrook (Canada)  
Roger Horn (USA)  
Mary B. Ruskai (USA)  
Stefano Serra Capizzano (Italy)  
Valeria Simoncini (Italy)

### Speakers at the Workshop

Ravindra B. Bapat (India)  
Bernd Beckermann (France)\*  
Dario Bini (Italy)  
Albrecht Bottcher (Germany)\*  
Nicola Guglielmi (Italy)  
Thomas Huckle (Germany)  
Ravi Kannan (India)  
Fuad Kittaneh (Jordan)  
Hideki Kosaki (Japan)  
Chi-Kwong Li (Canada)  
Yongdo Lim (Korea)  
Volker Mehrmann (Germany)  
Maher Moakher (Tunisia)  
Denes Petz (Hungary)  
Eugene Tyrtshnikoc (Russia)  
Xingzhi Zhan (China)\*  
..... and many of the lecturers at the School.

(\*) to be confirmed

### DEADLINE

for receipt of applications  
15 January 2009

School web page:  
<http://agenda.ictp.it/smr.php?2044>