



The Abdus Salam International Centre for Theoretical Physics


United Nations
Educational, Scientific
and Cultural Organization


International Atomic
Energy Agency

SCHOOL AND CONFERENCE ON ANALYTIC NUMBER THEORY

23 April - 11 May 2007

ICTP, Miramare - Trieste, Italy

The Abdus Salam International Centre for Theoretical Physics (ICTP) is organizing a School and Conference on Analytic Number Theory from 23 April to 11 May 2007. The activity will be directed by R. Balasubramanian (The Institute of Mathematical Sciences, Chennai, India), J.-M. Deshouillers (Université de Bordeaux 1, Bordeaux, France), and E. Kowalski (Université de Bordeaux 1, Bordeaux, France).

Analytic number theory originates from the most basic questions concerning natural numbers, and more generally from the natural impulse to wish to “count”, in one way or another, any type of object with arithmetical significance that may arise in nature (primes, other numbers with special multiplicative properties, integral or rational solutions of diophantine equations...). For this purpose, it has been long recognized that tools of harmonic analysis (in a very general sense) are basic and this has led to many of the general methods and heuristics currently available, and to much of the special flavour of this subject. The emphasis of the school will be on modern methods of analytic number theory and their interactions and applications to other areas of arithmetic and mathematics. Those have been recently strengthened not only with respect to arithmetic geometry and algebraic number theory (which are natural “partners” of analytic number theory), but also in much more unexpected directions, such as Random Matrix Theory, Quantum Chaos and Ergodic Theory. To quote two recent breakthroughs, J. B. Friedlander and H. Iwaniec have proved that there are infinitely many primes of the shape $x^2 + y^4$, B. J. Green and T. Tao have proved that there exist arbitrary long arithmetic progressions consisting only of prime numbers.

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

The **first week**, from 23 to 27 April 2007, will be devoted to:

Basics on Riemann zeta function and Dirichlet L series (K. Srinivas, Chennai, India)
Exponential sums over finite fields (E. Kowalski, Bordeaux, France)
Additive number theory (R. Balasubramanian, Chennai, India)
Modular forms and automorphic L functions (Ph. Michel, Montpellier, France)
Probabilistic methods (J.-M. Deshouillers, Bordeaux, France)

The **second week**, from 30 April to 4 May, will be devoted to:

Algorithmic aspects of analytic number theory (K. Belabas, Bordeaux, France)
Counting rational points on algebraic varieties (T. D. Browning, Bristol, United Kingdom)
Introduction to sieve methods (J. B. Friedlander, Toronto, Canada)
Additive combinatorics (B. J. Green, Cambridge, United Kingdom)

The school will close on lectures on **Analytic Number Theory without borders**, by **H. Iwaniec** (Rutgers, USA).

Besides the above-mentioned lecturers, a first list of invited speakers (August 2006, not all of them have yet confirmed) of the **third week's conference**, from 7 to 11 May 2007, includes:

V. Blomer (Toronto), **E. Bombieri** (IAS, Princeton), **B. Conrey** (AIM, Palo Alto), **R. de la Bretèche** (Paris), **E. Fouvry** (Orsay), **E. Friedman** (Santiago Chile), **H. Helfgott** (Bristol), **R. Holowinsky** (Rutgers), **Jianya Liu** (Shandong), **J. Marklof** (Bristol), **H. L. Montgomery** (Ann Arbor), **A. Perelli** (Genova), **G. Ricotta** (Bordeaux), **E. Royer** (Clermont-Ferrand), **Z. Rudnick** (Tel Aviv), **A. Sárközy** (Budapest), **P. Sarnak** (Princeton), **G. Tenenbaum** (Nancy), **A. Venkatesh** (New York), **U. Zannier** (Pisa).

Mathematicians from all countries that are members of the UN, UNESCO or IAEA can attend the activity. The main purpose of the Centre is to help researchers from developing countries within the framework of international cooperation. However, scientists from developed countries are most 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 applicants who are nationals of, and working in, developing countries, to be selected by the organizers. As scarcity of funds allows travel to be granted only in a few exceptional cases, every effort should be made by candidates to secure support for their fare (or at least half-fare) from their home country. Such financial support is available only to those attending the entire activity. There is no registration fee.

The closing date for the receipt of requests for participation is November 30, 2006

Candidates should complete, sign and return the **Application Form** obtainable through the ICTP WWW Server from the activity's Web Page, which will be constantly updated:

<http://agenda.ictp.it/smr.php?1836>

The Application form should be sent to:

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Trieste, August 2006



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LECTURERS

will include

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K. Belabas
Bordeaux, France

T.D. Browning
Bristol, United Kingdom

J.-M. Deshouillers
Bordeaux, France

J.B. Friedlander
Toronto, Canada

B.J. Green
Cambridge, United Kingdom

E. Kowalski
Bordeaux, France

Ph. Michel
Montpellier, France

K. Srinivas
Chennai, India

DEADLINE

for receipt of applications:
November 30, 2006