Announcement of a CIMPA-ICTP research school

LATTICES AND APPLICATION TO CRYPTOGRAPHY AND CODING THEORY

Lattices play a central role in number theory and its applications. The aim of this school is to introduce participants to the ubiquity of lattices in number theory, algebra, arithmetic algebraic geometry, cryptography and coding theory. The theory of lattices will be developed from its very beginning and the basic notions required for the applications in number theory, algebra, arithmetic algebraic geometry will be provided. Appearances of lattices that we intend to cover include: The natural lattice structure of Mordell-Weil groups and unit groups. Lie algebra root lattices. The lattice basis reduction algorithm " LLL ", which has many applications to many areas of mathematics and finally the construction of the famous Leech lattice. On the applied side we plan to cover constructions of good error-correcting codes and of good sphere packings via dense lattices.

Time: August 1 – 12, 2016
Location: Saigon University, Ho Chi Minh city, Vietnam.
Registration will be open from June 2015 and will end on May 22, 2016.

The school will focus on the following courses:

1. **Lattices and Geometry of numbers**
   Lecturer: **Michel Waldschmidt** (Université Pierre et Marie Curie)
2. **Lattices and Number theory**
   Lecturers: **Peter Stevenhagen** (Universiteit van Leiden) – **Tran Nguyen Thanh Ha** (Aalto university)
3. **Lattices and modular forms**
   Lecturers: **René Schoof** (Università di Roma Tor Vergata) – **Valerio Talamanca** (Università Roma Tre)
4. **Lattices in Lie algebras**
   Lecturer: **Laura Geatti** (Università di Roma Tor Vergata)
5. **Lattices and Mordell-Weil groups**
   Lecturers: **Francesco Pappalardi** (Università Roma Tre)– **Valerio Talamanca** (Università Roma Tre)
6. **Lattices and Coding theory**
   Lecturer: **Duong Hoang Dung** (Kyushu University)
7. **Lattices and cryptography**
   Lecturer: **Phong Nguyen (**Institut national de recherche en informatique et en automatique)

Scientific Committee: Laura Geatti (Università di Roma Tor Vergata), **Phong Nguyen** (Institut national de recherche en informatique et en automatique), **René Schoof** (Università di Roma Tor Vergata), **Anton Mellit** (SISSA-ICTP), **Peter Stevenhagen** (Universiteit van Leiden), **Valerio Talamanca** (Università Roma Tre).

Organizing Committee: Nguyen Dinh Thuc (University of Science, Vietnam National

University), **Pham Hoang Quan** (Saigon University), **Duong Hoang Dung** (Kyushu University), **Tran Nguyen Thanh Ha** (Aalto University)

ICTP local organizer: Fernando Rodriguez Villegas (ICTP).

Support: We would like to acknowledge the generous support from **CIMPA**, **ICTP**, **Number Theory Fundation (NTF), International Mathematical Union (IMU), Saigon University** and **University of Science.** There are support for Vietnamese and international students to attend the school. In order to participate in the school and apply for support, participants need to submit their application form, CV and one letter of recommendation. For more information on the application form and deadline, please visit the website of the school.

Further information: http://ricerca.mat.uniroma3.it/users/valerio/hochiminh16.html

Please direct all enquiries to **cimpa2016@gmail.com**