

REPORT CIMPA SCHOOL “COMMUTATIVE ALGEBRA WITH APPLICATIONS TO STATISTICS AND CODING THEORY” FROM JUNE 25TH TO JULY 6TH IN ZACATECAS, ZAC., MEXICO.

We had a total of 41 students, from 12 nationalities, as follows: 5 from Colombia, 19 from Mexico, 1 from Brazil, 1 from India, 1 from Chile, 3 from Cuba, 1 from El Salvador, 1 from Guatemala, 2 from Spain, 1 from Albania, and 1 from the U.S.A. There were 10 females and 31 males.

For the main courses, we had 6 lectures:

- Daniel Erman University of Wisconsin, USA
Title: Syzygies and monomial ideals.
- Fatemeh Mohammadi from the University of Bristol, UK
Title: Combinatorics of binomial and toric ideals.
- Sonja Petrovic from the Illinois Institute of Technology
Title: The role of algebraic statistics in estimation and modeling of random graphs and networks.
- Trygve Johnsen from the UiT – The Arctic University of Norway
Title: Algebraic-geometric codes.
- Johan Hansen from the Aarhus University, Denmark
Title: Toric Codes.
- Seth Sullivant from the North Carolina State University
Title: Algebraic Statistics and Applications to Biology.

The lecture of Sonja Petrovic was by video-conference, because she lost her fly.

Every day, all of the students participated in a (around) two-hours daily session of tutorials with the lecturers and the local, and scientific committee.

For the invited talks, we had 7 talks:

- Diane Maclagan (NZ) from the University of Warwick, UK
Title: Tropical Geometry
- Jordi Roca-Lacostena from the Universitat Politècnica de Catalunya, SPA.
Title: On the embedding problem for evolutionary Markov matrices
- Aida Maraj (USA), from University of Kentucky, MX
Title: Some Algebraic Properties of Hierarchical Models
- Rafael H. Villarreal from the Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional-IPN, MX
Title: Generalized minimum distance functions
- Ivan Soprunov from the University of Cleveland State University, USA.
Title: Toric codes and Minkowski length of polytopes
- Horacio Tapia Recillas from the Universidad Autónoma Metropolitana - Iztapalapa, MX
Title: k -normal elements and cyclic codes over Galois rings
- Marina Garrote López from the Universitat Politècnica de Catalunya, SPA.
Title: Stochasticity conditions for Phylogenetics Reconstruction

We had other invited to give an invited talk, Luis García, but he cancelled a month before, but we had bought his ticket and we lost it.

For the contributed talks, we had 5 talks:

- Mehta Ranjana from the Indian Institute of Technology Gandhinagar, IND.
Title: A family of Symmetric Numerical Semigroups

- Zachary Flores from the Colorado State University, USA.
Title: Lefschetz Properties for Certain Graded Modules
- Ernesto Álvarez González from the Universidad Complutense de Madrid, SPA.
Title: Advances in Parameter Estimation of lengths of a fix tree under JC69
- Henry Chimal Dzul from the Ohio University, USA
Title: When $\mathbb{R}[x]$ is a principal ideal ring?
- Hiram López Valdez from the Clemson University, USA
Title: LCD codes from Cartesian codes

Social activities

For the social activities we had:

- Wednesday, June 27th, we organized a night city tour, and a local folkloric music band through out in the old city center.
- Saturday, June 30th, we organized a tourist bus service to La Quemada, an archeological site nearby the city of Zacatecas, and a short visit to Jerez, a picturesque nearby old-town.
- Wednesday, July 4th, we organized the Gala Dinner at the Meson del Jobito, a traditional hotel in the old-town.

There was an interview for the newspaper “El Sol de Zacatecas”, published on Tuesday, June 26th, 2018, in the “Local” section.

There was an interview for the Local TV station “Television Azteca de Zacatecas” (XHLVZ-TDT) , aired on Tuesday, June 26th, 2018, in the local news program.

Organization.

The local committee picked up every participant from the local airport and local bus services. Every day, there was a free bus service from the hotel, and from the CIMPA venue at the Universidad Autónoma de Zacatecas.

Every CIMPA research school day the attendees received a free breakfast and lunch at the premises. The CIMPA scholars also got their dinner at the University, and were reimbursed for lunch and dinner on the weekends, we paid for them the breakfast on the weekends at the hotel. All of the participants stayed at the same hotel.

Upon registration on the first day, the participants were provided with a welcome kit from our sponsors, which included a notepad, a pen, and some tourist information.