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APORTACIONES MATEMÁTICAS
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Mexican Mathematicians in the World Trends and Recent Contributions

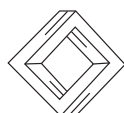
IV Meeting
Reunión de Matemáticos Mexicanos en el Mundo
June 10–15, 2018
Casa Matemática Oaxaca
Oaxaca, Mexico

Fernando Galaz-García
Cecilia González-Tokman
Juan Carlos Pardo Millán
Editors

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Preface

This volume contains the proceedings of the *IV Meeting of Mexican Mathematicians Abroad (IV Reunión de Matemáticos Mexicanos en el Mundo)*, held at Casa Matemática Oaxaca (CMO) in Oaxaca, Mexico, on June 10–15, 2018. This was the fourth in a series of ongoing biannual meetings connecting Mexican mathematicians residing abroad with their colleagues in Mexico. These events aim, on the one hand, at showcasing the research of Mexican mathematicians based abroad and, on the other hand, at strengthening academic connections among participants, Mexican institutions, and the broader mathematical community.

These conferences have been well received by the Mexican mathematical community, having had a visible positive impact on many levels. This can be readily seen when considering the number of new collaborations, international grant proposals, organization and participation in specialized events and, perhaps most importantly, the (re)incorporation of various speakers to Mexican academic institutions.

On this occasion, the meeting consisted of five days of activities, including 18 scientific talks, three poster sessions, three panels and discussion fora, and a public outreach talk, all supplemented with plenty of interaction time during meals and coffee breaks. This arrangement allowed for intense interactions and networking among the 53 workshop participants, who came from more than 10 countries and 10 Mexican states.

As in previous meetings, there were also opportunities for dialogue and analysis of issues relevant to the wider mathematical community and to colleagues working abroad. There was a round-table discussion on mobility, exchange, and opportunities for returning to Mexico (*Movilidad, Intercambio, Reincorporación*), featuring established members of the Mexican mathematical and scientific community: Alejandro Adem (University of British Columbia University), Daniel Juan (Centro de Ciencias Matemáticas, UNAM), Víctor Rivero (Centro de Investigación en Matemáticas), Gelasio Salazar (Universidad Autónoma de SLP and former President of the Mexican Mathematical Society), and Julia Tagüeña (CONACYT). In addition to this, there was an open forum led by Humberto Gutiérrez (Universidad de Guadalajara) and Silvia Reyes (Universidad Tecnológica de la Mixteca), heads of their departments of mathematics, and early-career researchers who recently joined Mexican institutions: Ana Rechtman (Instituto de Matemáticas, UNAM), Felipe García Ramos (CONACYT - Universidad Autónoma de San Luis Potosí), Alfredo Nájera (CONACYT - UNAM, Oaxaca), and Gerardo Hernández (UNAM, Juriquilla). Opportunities for graduate studies were discussed in a third forum.

The scientific talks were recorded using BIRS video facilities and are publicly available at the workshop website

<https://www.birs.ca/events/2018/5-day-workshops/18w5142>.

The organizing committee was composed of a mix of mathematicians based in Mexico and abroad:

- Luz Angélica Caudillo (University of British Columbia Canada),
- Felipe García (Universidad Autónoma de San Luis Potosí, CONACYT Mexico),
- Cecilia González-Tokman (The University of Queensland, Australia),
- Xavier Gómez-Mont (CIMAT, Mexico),
- Rita Jiménez Rolland (IMATE Oaxaca, UNAM, Mexico),
- César A. Lozano (UNAM, Unidad Oaxaca, CONACYT, Mexico),
- César Maldonado (Instituto Potosino de Investigación Científica y Tecnológica, Mexico),
- Juan Pablo Maldonado (Czech Technical University, Czech Republic),
- Ana Rechtman Bulajich (Université de Strasbourg, France, and IMATE, UNAM, Mexico),
- José Antonio Seade Kuri (IMATE, UNAM, Mexico).

All the affiliations in the preceding list, as well as the affiliations in the lists of speakers and participants, are those at the time the meeting took place.

The conference was made possible thanks to the financial support of Casa Matemática Oaxaca, CONACYT, FORDECyT, Sociedad Matemática Mexicana, Instituto de Física de la UASLP, Instituto de Matemáticas de la UNAM, and the logistic support of Claudia Arias (CMO), Karla Soto (UNAM), and América Carrasco (SMM). We thank the conference speakers and the participants for their commitment to making the meeting a success, the authors and referees who contributed their time and work to these proceedings, and the editorial committees and staff of Aportaciones Matemáticas and Contemporary Mathematics for their support in preparing this volume.

Fernando Galaz-García
Durham University

Cecilia González-Tokman
The University of Queensland

Juan Carlos Pardo Millán
CIMAT



Organizers at the Fourth Meeting of Mexican Mathematicians Abroad, CMO, June 10–15, 2018. (Photo by CMO)



Poster session at the Fourth Meeting of Mexican Mathematicians Abroad, CMO, June 10–15, 2018. (Photo by CMO)



Participants at the Fourth Meeting of Mexican Mathematicians Abroad, CMO, June 10–15, 2018. (Photo by CMO)

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- An example of the Deligne–Mumford compactification
Araceli Bonifant, University of Rhode Island (USA)
- On the Mumford–Tate conjecture for Abelian varieties
Victoria Cantoral Farfán, International Centre for Theoretical Physics (Italy)
- A non-commutative topological dimension
Jorge Castillejos, Katholieke Universiteit Leuven (Belgium)
- Isoperimetric and Sobolev inequalities on magnetic graphs
Javier Chávez Domínguez, University of Oklahoma (USA)
- Positive Ricci Curvature and Actions of High Dimensional Tori
Diego Corro Tapia, Karlsruher Institut für Technology (Germany)
- Metastable convergence of ergodic averages: the continuous logic viewpoint
Eduardo Dueñez, Spelman College (USA)
- Einstein metrics on 4-manifolds
Ixchel Dzohara Gutiérrez Rodríguez, Universidad de Santiago de Compostela (Spain)
- Identifying unique observations in storm super-resolved microscopic images via a spatio-temporal model
Alejandra Donaji Herrera Reyes, University of British Columbia (Canada)
- Dressing-up surfaces
Alfredo Hubard, Université Marne-La Vallée (France)
- Singularly Perturbed Ordinary Differential Equations
Hildeberto Jardón, Technical University Munich (Germany)

- Some connections between functional and volumetric inequalities in convex geometry
Carlos Hugo Jiménez Gómez, PUC-Rio (Brasil)
- Modelling the effect of temperature on sleep quality
Alicia Prieto Langarica, Youngstown University (USA)
- Determinism and Chaos (Public Outreach Talk)
Ana Rechtman Bulajich, Université de Strasbourg (France) and UNAM (Mexico)
- The hybridizable discontinuous Galerkin method: An application to magnetic equilibrium in fusion reactors
Tonatiuh Sánchez-Vizuet, Courant Institute of Mathematical Sciences (USA)
- Synthetic curvature and isometries
Jaime Santos Rodríguez, Universidad Autónoma de Madrid (Spain)
- The minimum quadratic non-residue and related problems
Enrique Treviño, Lake Forest College (USA)
- The set-intersection problem and its applications
Paola Vera Licona, University of Connecticut Health Center (USA)
- Microlocal and semiclassical analysis
Alejandro Uribe, University of Michigan, Ann Arbor (USA)

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This book features surveys and research articles from five broad research areas: algebra, analysis, combinatorics, geometry, and topology. Their topics range from general relativity and mathematical physics to interactions between logic and ergodic theory. Several articles provide a panoramic view of the fields and problems on which the authors are currently working on, showcasing diverse research lines complementary to those currently pursued in Mexico. The research-oriented manuscripts provide either alternative approaches to well-known problems or new advances in active research fields.



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