CONTEMPORARY MATHEMATICS

450

Poisson Geometry in Mathematics and Physics

International Conference
June 5–9, 2006
Tokyo, Japan

Giuseppe Dito
Jiang-Hua Lu
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Foreword

The conference "Poisson 2006: Poisson Geometry in Mathematics and Physics" was held from June 5 through 9, 2006 at the National Olympics Memorial Youth Center in Tokyo. There were about 150 participants, including 25 invited speakers, and 20 presenters at a poster session.

The speakers were chosen by a Scientific Committee of ten members, chaired by Alan Weinstein, while local organization was handled by a separate committee headed by Yoshiaki Maeda and Giuseppe Dito.

The meeting was preceded by a school of about three days, organized by Giuseppe Dito, Yoshiaki Maeda and Alan Weinstein, consisting of a lecture series designed to provide background for the conference talks, as well as invited topical lectures by young participants.

Sponsoring organizations for the conference and school included the Mathematical Society of Japan, the European Mathematical Society, the American Mathematical Society, the Bernoulli Center at EPFL Lausanne, and the 21st Century Center of Excellence (COE) at Keio University. The COE provided the majority of funding, with additional support from the US National Science Foundation.

Poisson 2006 was the fifth in a series of international conferences on Poisson geometry, held every two years. The first, in 1998, took place at the Banach Centre in Warsaw, with subsequent meetings at CIRM in Luminy, IST in Lisbon, and the University of Luxembourg. Further information about all these meetings, as well as the one to be held in 2008 at EPFL in Lausanne, may be found on the Poisson Geometry Home Page at `poissongeometry.org`, which links to the videos of all the talks of the conference Poisson 2006 and principal lectures of the school.

The aim of these meetings has been to bring together mathematicians and mathematical physicists who work in diverse areas and share a common interest in Poisson geometry. With roots in classical mechanics from 200 years ago and the work of Sophus Lie from a century ago, the subject of Poisson geometry crystallized through the work of Kirillov and Lichnerowicz in the 1970's and has been particularly driven by the program of "deformation quantization", in which Poisson structures appear as the first deviation from commutativity in families of associative algebras. Subjects where Poisson geometry plays an essential role include symplectic geometry and topology, deformation theory, representation theory, hamiltonian dynamics, and field theory.

In preparing the program for Poisson 2006, the Scientific Committee made a special effort to include speakers from "outside" areas which were relevant to Poisson geometry and its applications. The program of Poisson 2006 (conference and school) was remarkable for the overlap of topics, some intentional, some fortuitous, between the lectures. Here are some examples:

- Generalized complex stuctures and other geometry on $TM+T^*M$ (Bursztyn, Gualtieri, Meinrenken, Uchino, Yoshimura)
- Stacks and twisting by a three-form (Gomi, Schapira, Tsygan, Van den Bergh)
- Orbifolds and other singular spaces as differentiable stacks (Crainic, Holm, Weinstein, Xu, Zhu)
- Normal forms of Poisson structures in the neighborhood of points and symplectic leaves (Dufour, Fernandes, Ratiu, Zung)
- Deformation of Poisson structures (Ikeda, Zhang)
- Reduction of systems with symmetry (Bursztyn, Cardona, Cattaneo, Holm, Ratiu, Yoshimura)
- Kontsevich formality and its variants (Alekseev, Kontsevich, Merkulov, Park, Tsygan, Van den Bergh, Waldmann)
- Log-canonical coordinates (Gekhtman, Kontsevich, Lu)
- Group-valued momentum maps (Meinrenken, Schaffhauser)
- Strict quantization of spaces via group actions (Rieffel, Voglaire, Waldmann)
- Quantization of canonical transformations via their graphs (Kontsevich, Schapira, Van den Bergh, Weinstein)

The present volume consists of refereed papers by many of the invited speakers at the conference and by the principal lecturers at the school. Papers by presenters at the poster session and by other speakers at the school will be appearing in *Travaux Mathématiques.*

Giuseppe Dito, Jiang-Hua Lu, Yoshiaki Maeda, Alan Weinstein

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This volume is a collection of articles by speakers at the conference "Poisson 2006: Poisson Geometry in Mathematics and Physics", which was held June 5–9, 2006, in Tokyo, Japan. Poisson 2006 was the fifth in a series of international conferences on Poisson Geometry that are held once every two years. The aim of these conferences is to bring together mathematicians and mathematical physicists who work in diverse areas but have common interests in Poisson Geometry. The program for Poisson 2006 was remarkable for the overlap of topics that included deformation quantization, generalized complex structures, differentiable stacks, normal forms, and group-valued moment maps and reduction. The articles represent current research in Poisson Geometry and should be valuable to anyone interested in Poisson Geometry, symplectic geometry, and mathematical physics. This volume also contains lectures by the principal speakers of the three-day school held at Keio University that preceded Poisson 2006.

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