

POISSON GEOMETRY

Stanisław Zakrzewski
in memoriam

Editors of the Volume

JANUSZ GRABOWSKI

PAWEŁ URBAŃSKI

WARSZAWA 2000

FOREWORD

Poisson geometry originated in the study of classical mechanics and took on new importance when Poisson brackets were understood as the classical “shadow” of quantum commutator brackets. Although some of the basic examples and properties of Poisson brackets were already found in the 19th century (Poisson, Jacobi, Lie...), the systematic study of Poisson geometry really began with the work of Lichnerowicz and Kirillov in the mid 1970’s. Over the following two decades, the subject flourished to the point where it seemed appropriate to convene an international workshop on Poisson geometry.

In 1996, the Banach Center proposed to Professors Janusz Grabowski and Stanisław Zakrzewski that they organize such a meeting in 1998 as a satellite conference to the ICM in Berlin. Along with Jean-Paul Dufour and Mikhail Zhitomirskii, I gladly joined the organizing committee of the workshop, although personal considerations eventually made it impossible for me to attend. The aim of the meeting, which was well realized, was to gather people working on all aspects of the geometric, algebraic, and physical aspects of Poisson manifolds and their quantizations.

As all the workshop participants and many readers of this volume know, Stan* Zakrzewski died suddenly at the end of April, 1998, less than four months before the meeting**. The importance of Stan’s contributions to Poisson geometry, his role in organizing the workshop, and most important the warm personal feelings we had toward our friend left no question but that this workshop and its proceedings would be dedicated to his memory.

On behalf of the editors, I hope that this volume will enable its readers (myself included!) to benefit from the assembly of Poisson geometers gathered in Warsaw in August, 1998, and to learn the “state of the art” in the young subject in which Stanisław Zakrzewski’s scientific and personal contributions have meant so much.

Alan Weinstein

* “Stan” was his self-chosen English nickname. Of course, he was Staszek, Staś to his Polish friends.

** Workshop on Poisson Geometry, 3–15 August 1998, Warsaw.

CONTENTS

Stanisław Zakrzewski (28.6.1951–30.4.1998)	9–10
S. ZAKRZEWSKI, Poisson structures on \mathbb{R}^{2n} having only two symplectic leaves: the origin and the rest	11–13
S. BOUARROUDJ and V. Yu. OVSIENKO, Schwarzian derivative related to modules of differential operators on a locally projective manifold	15–23
P. BONNEAU, Classifications of star products and deformations of Poisson brackets	25–29
M. CAHEN, S. GUTT and J. RAWNSLEY, Symplectic connections with parallel Ricci tensor	31–41
J. F. CARIÑENA and J. CLEMENTE-GALLARDO, Quantization of the cotangent bundle via the tangent groupoid	43–53
V. CHLOUP, Linearization and star products	55–60
J.-P. DUFOUR, Singularities of Poisson and Nambu structures	61–68
V. L. GINZBURG and R. MONTGOMERY, Geometric quantization and no-go theorems	69–77
J. GRABOWSKI, Isomorphisms of Poisson and Jacobi brackets	79–85
J. HUEBSCHMANN, Differential Batalin-Vilkovisky algebras arising from twilled Lie-Rinehart algebras	87–102
E. KAROLINSKY, A classification of Poisson homogeneous spaces of complex reductive Poisson-Lie groups	103–108
Y. KOSMANN-SCHWARZBACH, Modular vector fields and Batalin-Vilkovisky algebras	109–129
O. KRAVCHENKO, Deformations of Batalin-Vilkovisky algebras	131–139
J. KUBARSKI, Connections in regular Poisson manifolds over \mathbb{R} -Lie foliations	141–149
P. LIBERMANN, On Liouville forms	151–164
Z. J. LIU, Some remarks on Dirac structures and Poisson reductions	165–173
K. C. H. MACKENZIE, Affinoid structures and connections	175–186
G. MARÍ BEFFA, The theory of differential invariance and infinite dimensional Hamiltonian evolutions	187–196
C.-M. MARLE, On submanifolds and quotients of Poisson and Jacobi manifolds	197–209
K. MIKAMI and A. WEINSTEIN, Self-similarity of Poisson structures on tori	211–217
P. MORMUL, Contact Hamiltonians distinguishing locally certain Goursat systems	219–230
I. V. MYKITYUK and A. M. STEPIN, Classification of almost spherical pairs of compact simple Lie groups	231–241
N. NAKANISHI, Nambu-Poisson tensors on Lie groups	243–249
A. PANASYUK, Veronese webs for bihamiltonian structures of higher corank	251–261
P. STACHURA, C^* -algebra of a differential groupoid	263–281
I. VAISMAN, Aspects of geometric quantization theory in Poisson geometry	283–292