Contents

List of Participants vii

Preface xiii

W. K. Clifford as a geometer
HANNA NENCKA AND JEAN-PIERRE BOURGUIGNON xv

PART I. Clifford Algebras 1

Clifford and the 'square root' ideas
A. TRAUTMAN 3

Dirac's algebra and Brauer-Wall groups
BIRGER IVERSEN 25

Linear endomorphisms of Clifford algebras
D. KASTLER AND M. MEBKHOUT 37

PART II. Riemannian Surfaces 39

Uniformizations of Riemann surfaces: Poincaré theta series, Riemann's theta function and theta constants
I. KRA 41

Adapted metrics and Möbius transformations defined over Clifford algebras
WILLIAM ABIKOFF 71

PART III. Information Geometry 79

Information geometry
S.-I. AMARI 81

An example of dynamical behaviour of the relative entropy
G. BURDET, H. NENCKA, AND M. PERRIN 97

Information geometry and learning in formal neural networks
P. COMBE AND H. NENCKA 105

Statistical dynamics and information geometry
R. F. STREATER 117

PART IV. Noncommutative Geometry 133

On finite differential calculi
D. KASTLER, J. MADORE, AND T. MASSON 135

Some aspects of noncommutative differential geometry
M. DUBOIS-VIOLETTE 145

Connections of bimodules in non-commutative geometry
D. KASTLER, J. MADORE, AND D. TESTARD 159

Riemannian and non-commutative geometry in physics
B. IOCHUM, D. KASTLER, AND T. SCHÜCKER 165

Spectral model and fuzzy mass relations
BRUNO IOCHUM, DANIEL KASTLER, AND THOMAS SCHÜCKER 175

PART V. Cosmology and General Relativity 191

Not so simple universe
M. DEMIAŃSKI 193

Extended tensorial curvature analysis for embeddings and foliations
B. CARTER 207

Spaces admitting a foliation by isotropic hypersurfaces
T. PAPAKOSTAS 221

An alternative to inflation
R. TRIAY 227

PART VI. Symplectic Geometry and Self-Similar Structures 239

A class of homogeneous symplectic manifolds
P. BIELIAVSKY, M. CAHEN, AND S. GUTT 241

rth order conditionally convergent series of fractal domains
JENNY HARRISON 257

PART VII. Field Theory 269

Chern-Simons vortices
C. DUVAL AND P. HORVÁTHY 271

The generalized local instability criterion from the geodesic deviation equation
MAREK SZYDŁOWSKI 289