Advanced Lectures in Mathematics (ALM)

ALM 1: Superstring Theory

ALM 2: Asymptotic Theory in Probability and Statistics with Applications

ALM 3: Computational Conformal Geometry

ALM 4: Variational Principles for Discrete Surfaces

ALM 6: Geometry, Analysis and Topology of Discrete Groups

ALM 7: Handbook of Geometric Analysis, No. 1

ALM 8: Recent Developments in Algebra and Related Areas

ALM 9: Automorphic Forms and the Langlands Program

ALM 10: Trends in Partial Differential Equations

ALM 11: Recent Advances in Geometric Analysis

ALM 12: Cohomology of Groups and Algebraic K-theory

ALM 13: Handbook of Geometric Analysis, No. 2

ALM 14: Handbook of Geometric Analysis, No. 3

ALM 15: An Introduction to Groups and Lattices: Finite Groups and Positive Definite Rational Lattices

ALM 16: Transformation Groups and Moduli Spaces of Curves

ALM 17: Geometry and Analysis, No. 1

ALM 18: Geometry and Analysis, No. 2

ALM 19: Arithmetic Geometry and Automorphic Forms

ALM 20: Surveys in Geometric Analysis and Relativity

ALM 21: Advances in Geometric Analysis

ALM 22: Differential Geometry: Under the Influence of S.-S. Chern

Advanced Lectures in Mathematics
Volume XXII

Differential Geometry

Under the Influence of S.-S. Chern

edited by

Yibing Shen · Zhongmin Shen · Shing-Tung Yau

International Press
www.intlpress.com

高 等 教 育 出 版 社
HIGHER EDUCATION PRESS

Advanced Lectures in Mathematics, Volume XXII
Differential Geometry: Under the Influence of S.-S. Chern

Volume Editors:
Yibing Shen (Zhejiang University)
Zhongmin Shen (Indiana University - Purdue University Indianapolis)
Shing-Tung Yau (Harvard University)

Copyright © 2012 by International Press, Somerville, Massachusetts, U.S.A., and by Higher Education Press, Beijing, China.

This work is published and sold in China exclusively by Higher Education Press of China.

All rights reserved. Individual readers of this publication, and non-profit libraries acting for them, are permitted to make fair use of the material, such as to copy a chapter for use in teaching or research. Permission is granted to quote brief passages from this publication in reviews, provided the customary acknowledgement of the source is given. Republication, systematic copying, or mass reproduction of any material in this publication is permitted only under license from International Press. Excluded from these provisions is material in articles to which the author holds the copyright. (If the author holds copyright, notice of this will be given with the article.) In such cases, requests for permission to use or reprint should be addressed directly to the author.

ISBN: 978-1-57146-249-7

Printed in the United States of America.

16 15 14 13 12 1 2 3 4 5 6 7 8 9

ADVANCED LECTURES IN MATHEMATICS

Executive Editors

Shing-Tung Yau
Harvard University

Lizhen Ji
University of Michigan, Ann Arbor

Kefeng Liu
University of California at Los Angeles
Zhejiang University
Hangzhou, China

Editorial Board

Chongqing Cheng
Nanjing University
Nanjing, China

Zhong-Ci Shi
Institute of Computational Mathematics
Chinese Academy of Sciences (CAS)
Beijing, China

Zhouping Xin
The Chinese University of Hong Kong
Hong Kong, China

Weiping Zhang
Nankai University
Tianjin, China

Xiping Zhu
Sun Yat-sen University
Guangzhou, China

Tatsien Li
Fudan University
Shanghai, China

Zhiying Wen
Tsinghua University
Beijing, China

Lo Yang
Institute of Mathematics
Chinese Academy of Sciences (CAS)
Beijing, China

Xiangyu Zhou
Institute of Mathematics
Chinese Academy of Sciences (CAS)
Beijing, China

Contents

Jianguo Cao and Hongyan Tang: Gauss-Bonnet-Chern Formulae and Related Topics for Curved Riemannian Manifolds 1

Sun-Yung A. Chang and Paul Yang: Progress in Conformal Geometry 15

Fuquan Fang and Zhenlei Zhang: Long Term Solutions of Normalized Ricci Flow 21

Jianquan Ge and Zizhou Tang: Chern Conjecture and Isoparametric Hypersurfaces 49

Hui-Ling Gu and Xi-Ping Zhu: On the Classification of Kähler Manifolds with Positive Bisectional Curvature 61

Enli Guo, Xiaohuan Mo and Xiaoyang Wang: On Projectively Flat Finsler Metrics 77

Lizhen Ji: Buildings and Their Applications in Geometry and Topology 89

Shanyu Ji: Spherical CR Geometry and Holomorphically Immersed Spheres 211

Guji Tian and Xu-Jia Wang: A Perturbation Method for Elliptic and Parabolic Equations 231

McKenzie Y.-K. Wang: Einstein Metrics from Symmetry and Bundle Constructions: A Sequel 253

Guofang Wei: Volume Comparison and Its Generalizations 311

Xiaohua Zhu: Kähler-Ricci Flow on a Toric Manifold with Positive First Chern Class 323