

## Contents

Preface	v
Photo: WIN—Women In Numbers, November 2008	ix
Workshop Participants and Affiliations at the Time of the Workshop	x
PART I – MODULI SPACES AND SHIMURA CURVES	
Hilbert Modular Variety Computations HELEN GRUNDMAN	3
Contributions to Shimura Curves PILAR BAYER	15
Igusa Class Polynomials, Embedding of Quartic CM Fields, and Arithmetic Intersection Theory HELEN GRUNDMAN, JENNIFER JOHNSON-LEUNG, KRISTIN LAUTER, ADRIANA SALERNO, BIANCA VIRAY, AND ERIKA WITTENBORN	35
$l$ -Adic Étale Cohomology of PEL Type Shimura Varieties with Non-Trivial Coefficients ELENA MANTOVAN	61
PART II – CURVES AND JACOBIANS OVER FINITE FIELDS	
Pairings on Hyperelliptic Curves JENNIFER BALAKRISHNAN, JULIANA BELDING, SARAH CHISHOLM, KIRSTEN EISENTRÄGER, KATHERINE E. STANGE, and EDLYN TESKE	87
Biased Statistics for Traces of Cyclic $p$ -Fold Covers over Finite Fields ALINA BUCUR, CHANTAL DAVID, BROOKE FEIGON, and MATILDE LALÍN	121
The $\ell$ -Rank Structure of a Global Function Field LISA BERGER, JING LONG HOELSCHER, YOONJIN LEE, JENNIFER PAULHUS, and RENATE SCHEIDLER	145

PART III – GALOIS COVERS OF FUNCTION FIELDS IN  
POSITIVE CHARACTERISTIC

A Survey of Galois Theory of Curves in Characteristic  $p$  169  
RACHEL PRIES and KATHERINE STEVENSON

Covers of the Affine Line in Positive Characteristic with  
Prescribed Ramification 193  
IRENE I. BOUW

Semi-Direct Galois Covers of the Affine Line 201  
LINDA GRUENDKEN, LAURA HALL-SEELIG, BO-HAE IM,  
EKIN OZMAN, RACHEL PRIES, and KATHERINE STEVENSON

PART IV – ZETA FUNCTIONS OF GRAPHS

Looking into a Graph Theory Mirror of Number Theoretic Zetas 213  
AUDREY TERRAS

Zeta Functions of Group Based Graphs and Complexes 225  
WEN-CHING W. LI

Ramified Covers of Graphs and the Ihara Zeta Functions of  
Certain Ramified Covers 237  
BETH MALMSKOG and MICHELLE MANES

PART V – OTHER TOPICS

Zeros of Classical Eisenstein Series and Recent Developments 251  
SHARON ANNE GARTHWAITE, LING LONG, HOLLY SWISHER,  
and STEPHANIE TRENEER

On the  $\mu$ -Invariant in Iwasawa Theory 265  
SUJATHA RAMDORAI

Galois Representations and the Tame Inverse Galois Problem 277  
SARA ARIAS-DE-REYNA and NÚRIA VILA