

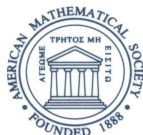
# CONTEMPORARY MATHEMATICS

177

## Representation Theory and Analysis on Homogeneous Spaces

A Conference in Memory of Larry Corwin  
February 5–7, 1993  
Rutgers University

Simon Gindikin  
Roe Goodman  
Frederick P. Greenleaf  
Paul J. Sally, Jr.  
Editors



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Representation Theory  
and Analysis  
on Homogeneous Spaces

# CONTEMPORARY MATHEMATICS

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Editors



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American Mathematical Society  
Providence, Rhode Island



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The papers in this volume are based on lectures presented at the conference Representation Theory and Analysis on Homogeneous Spaces held at Rutgers University on February 5–7, 1993. This conference was dedicated to the memory of Larry Corwin.

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To the memory of Larry Corwin

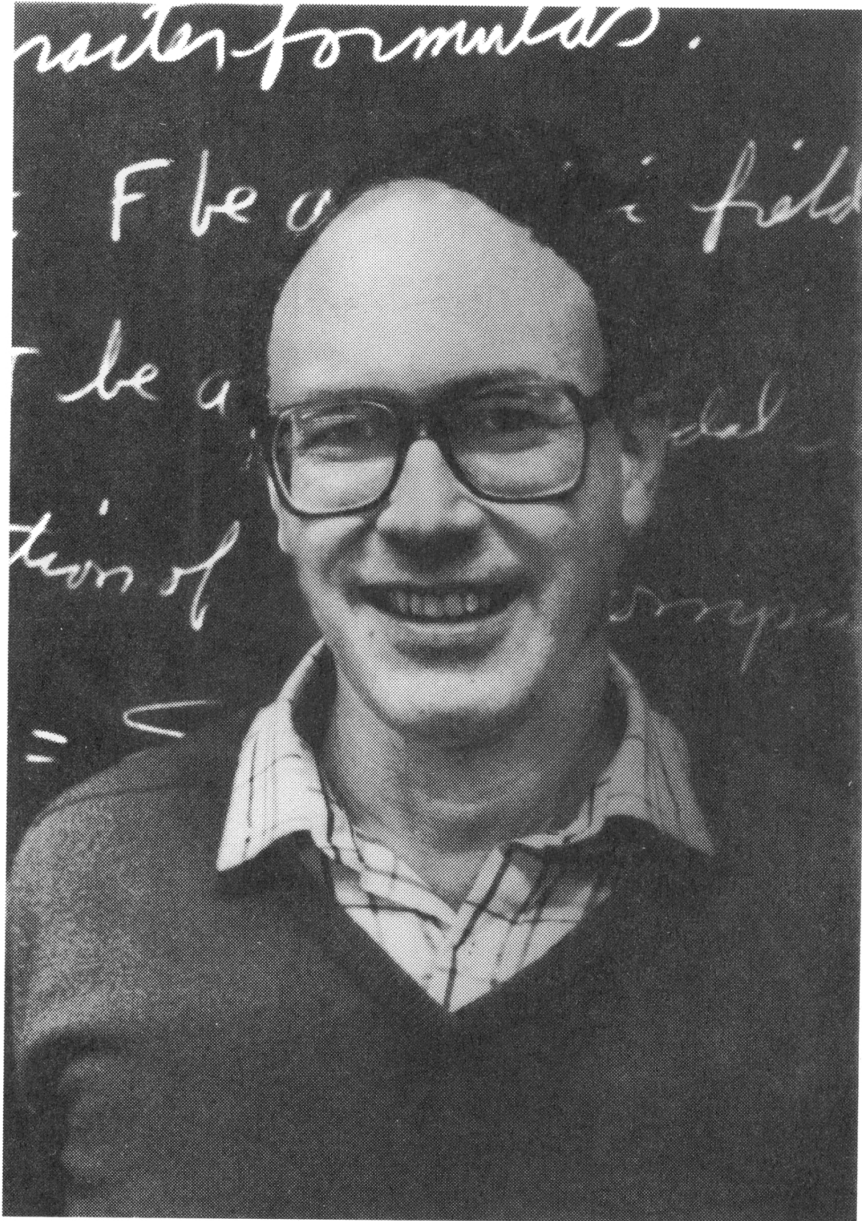


Photo by Nick Romanenko

LAWRENCE J. CORWIN

January 20, 1943 - March 19, 1992

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## Introduction

This papers in this volume are based on lectures presented at the conference on *Representation Theory and Analysis on Homogeneous Spaces*, held at Rutgers University, New Brunswick, New Jersey on February 5-7, 1993. This conference was dedicated to the memory of Larry Corwin, who died on March 19, 1992. The time of the conference essentially coincided with the 50th anniversary of Larry's birth.

The organizing committee for the conference<sup>1</sup> decided to emphasize the two areas of representation theory to which Larry made outstanding contributions: nilpotent Lie groups and  $p$ -adic groups. We invited speakers who could describe the current state and possible future direction of these fields for the benefit of mathematicians in related fields, recent Ph.D.'s and graduate students. Many of the speakers had long-term scientific connections with Larry; we are sure that they focussed their talks on areas that he would have found exciting. We think the papers presented here will also be of interest to the experts in representation theory. The papers of Fred Greenleaf and Paul Sally give surveys of Larry Corwin's work. A complete list of his publications, including papers currently in press, is also included.

Thanks to support from the National Science Foundation, we were able to provide travel and subsistence for 26 graduate students (from 10 universities) and 12 recent Ph.D.'s to attend the conference. The full conference program and the list of participants appears at the end of this volume.

We hope that the conference and this volume will contribute to the this vital field of mathematics which was so important to Larry Corwin.

The Editors

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<sup>1</sup>Simon Gindikin (Rutgers), Roe Goodman (Rutgers), Fred Greenleaf (Courant), Roger Howe (Yale), James Lepowsky (Rutgers), Linda Rothschild (UCSanDiego), Paul Sally (Chicago), Nolan Wallach (UCSanDiego), Joseph Wolf (UCBerkeley)

## Conference on Representation Theory and Analysis on Homogeneous Spaces<sup>1</sup>

**Friday, February 5, 1993**

Roger Howe

*Hecke algebras and  $p$ -adic groups*

Robert Langlands

*Percolation and conformal invariance*

Israel Gelfand

*Hopf structure and Heisenberg algebras;*

*Determinants of multidimensional matrices*

(report on joint work with L. Corwin and with V. Dolotin)

**Saturday, February 6, 1993**

Nolan Wallach

*On the restrictions of admissible representations to subgroups*

James Arthur

*Orbital integrals and weighted orbital integrals*

Fred Greenleaf

*Larry Corwin's contributions to analysis on nilpotent homogeneous spaces*

Paul Sally

*Larry Corwin's contributions to representations of  $p$ -adic groups*

Diana Shelstad

*Some remarks on twisted endoscopy*

Fiona Murnaghan

*Local character expansions for supercuspidal representations*

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<sup>1</sup>Supported by Rutgers University and NSF Grant DMS-92-16987

**Sunday, February 7, 1993**

Ronald Lipsman

*Applications and attributes of the Corwin-Greenleaf multiplicity function*

Niels Pedersen

*Matrix coefficients of nilpotent Lie groups*

Carolyn Pfeffer Johnston

*Representations of discrete rational nilpotent groups*

Phil Kutzko

*The Bernstein decomposition of the smooth dual of a  $p$ -adic group via semi-simple types*

Allen Moy

*Unitarity for  $p$ -adic groups*

Tom Hales

*Character Values and Hyperelliptic Curves***Conference Participants**

Jeff Adler	University of Chicago
Andrey Alekseevsky	Moscow University
James Arthur	University of Toronto
Magdy Assem	University of Ottawa
Paolo Barbanò	CUNY-Lehman College
Dan Barbasch	Cornell University
Moshe Baruch	Yale University
Chal Benson	Univ. of Missouri-St. Louis
Karem Bettaieb	Université de Paris VII
Alfredo Brega	Columbia University
Renee Burton	SUNY-Stony Brook
Enriqueta Rodríguez-Carrington	CUNY-College of Staten Island
Jiangping Chen	Yale University
Neil Chriss	University of Chicago
Darwyn C. Cook	Louisiana State University
Brad Currey	Saint Louis University
Jacek M. Cygan	Louisiana State University
Joseph D'Atri	Rutgers University-New Brunswick
Vinay Deodhar	IAS - Princeton
Hongming Ding	St. Louis University
Art Dupre	Rutgers University-Newark
Sam Evens	University of Arizona
David Farmer	Columbia University
Jeffrey Fox	University of Colorado
Israel Gelfand	Rutgers University



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Simon Gindikin	Rutgers University-New Brunswick
David Goldberg	Purdue University
Gerald A. Goldin	Rutgers University-New Brunswick
Roe Goodman	Rutgers University-New Brunswick
Ruth Gornet	Washington University-St. Louis
Ian Graznowski	IAS - Princeton
Frederick P. Greenleaf	Courant Institute-NY University
Jiandong Guo	Columbia University
Jeff Hakim	The American University
Tom Hales	University of Chicago
Brian Hall	Cornell University
Michael J. Heomos	Columbia University
Dolors Herbera	Rutgers University-New Brunswick
Roger Howe	Yale University
Jing-song Huang	University of Utah
Reid Huntsinger	University of Chicago
Junko Inoue	Kyushu University
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David Joyner	U.S. Naval Academy
Elizabeth Jurisich	Rutgers University-New Brunswick
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**Representation Theory and Analysis on Homogeneous Spaces**  
Simon Gindikin, Roe Goodman, Frederick P. Greenleaf,  
and Paul J. Sally, Jr., Editors

Combining presentation of new results with in-depth surveys of recent work, this book focuses on representation theory and harmonic analysis on real and  $p$ -adic groups. The papers are based on lectures presented at a conference dedicated to the memory of Larry Corwin and held at Rutgers University in February 1993. The book presents a survey of harmonic analysis on nilpotent homogeneous spaces, results on multiplicity formulas for induced representations, new methods for constructing unitary representations of real reductive groups, and a unified treatment of trace Paley-Wiener theorems for real and  $p$ -adic reductive groups. In the representation theory of the general linear group over  $p$ -adic fields, the book provides a description of Corwin's contributions, a survey of the role of Hecke algebras, and a presentation of the theory of simple types. Other types of reductive  $p$ -adic groups are also discussed. Among the other topics included are the representation theory of discrete rational nilpotent groups, skew-fields associated to quadratic algebras, and finite models for percolation. A timely publication featuring contributions by some of the top researchers in the field, this book offers a perspective not often found in conference proceedings.

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