

**INSTITUTE OF ADVANCED STUDIES IN MATHEMATICS**

Technion-Israel Institute of Technology



INTERNATIONAL CONFERENCE

on

# GEOMETRIC AND COMBINATORIAL GROUP THEORY

will be held on

**13-21 June, 2000**

at the

**Technion-Israel Institute of Technology**



**Haifa, Israel**

The conference will be devoted to current developments in geometric and combinatorial group theory. While the scope of the conference is intended to be broad, there will be an emphasis on developments in the theory of automorphisms of free groups in recent years.

*Organizers:* Arye Juhasz and Michah Sageev

*For further information:*

Sylvia Schur (Secretary)

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# PROGRAM

## Tuesday, June 13

08:30-09:45 Registration


### Morning session

#### Butler Auditorium

09:45-10:00 Greetings and Opening remarks

10:00-10:50 Karen Vogtmann (Ithaca, New York)  
Automorphisms of Free Groups and Outer Space (survey)

11:00-11:50 Zlil Sela (Jerusalem, Israel)  
Diophantine Geometry over Groups

11:50-12:10 

12:10-13:00 Paul Schupp (Urbana, Illinois)  
Computational Complexity and the Membership Problem


### Afternoon sessions

#### Parallel session 1

##### Butler Auditorium

14:30-15:00 Sylvia Benvenuti (Dijon, France)  
Complex of Curves and Presentations of the Mapping Class Group of a Surface

15:10-15:40 Tullio Ceccherini-Silberstein (Rome, Italy)  
Paradoxical Decompositions of Free Burnside Groups

15:40-16:10 

16:10-16:40 Daniel Piollet (Paris, France)  
Mapping Class and Transvection Groups


16:50-17:20 Thomas Brady (Dublin, Ireland)  
Artin Groups of Finite Type

#### Parallel session 2

##### Room 231 Amado Mathematics Building

14:30-15:00 Rita Gitik (Ann Arbor, Michigan)  
Algorithmic Problems in Negatively Curved Groups

15:10-15:40 Richard Thomas (Leicester, England)  
Groups and Formal Languages

15:40-16:10 

16:10-16:40 Susan Hermiller (Lincoln, Nebraska)  
Finite Derivation Type


16:50-17:20 Sarah Rees (Newcastle-upon-Tyne, U.K.)  
Solving the Word Problem in Real Time

#### Parallel session 3

##### Room 232 Amado Mathematics Building

14:30-15:00 Tatiana Smirnova-Nagnibeda (Stockholm, Sweden)  
To be announced

15:10-15:40 Dhmhtrios Varsos (Athens, Greece)  
Finiteness Conditions of Certain HNN Extensions

15:40-16:10 

16:10-16:40 Evangelos Raptis (Athens, Greece)  
Subgroup Separable HNN-Extensions of Abelian Groups

16:50-17:20 Amnon Rosenmann (Tel Aviv, Israel )  
On the Rank of Roots and Equations in Free Groups

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17:30 Informal reception



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## Wednesday, June 14

### Morning session

#### Butler Auditorium

09:00-09:50 Gilbert Levitt (Toulouse, France)  
On the Dynamics of Automorphisms of Free Groups

10:00-10:50 Daan Krammer (Basel, Switzerland)  
Braid Groups are Linear

10:50-11:20 

11:20-12:10 Stephen Bigelow (Berkeley, California)  
Braid Groups are Linear


### Afternoon sessions

#### Parallel session 1

##### Butler Auditorium

14:30-15:00 Debra Boutin (Clinton, New York)  
Realizing Finite Groups in Euclidean Space

15:10-15:40 Matthew Zinno (New York)  
Braid Group Linearity and the BMW Algebra

15:40-16:10 

16:10-16:40 Marta Rampichini (Milan, Italy)  
Fibred Closed Braids

16:50-17:20 Joan Birman (New York)  
The Infimum, Supremum and Geodesic Length of a Braid Conjugacy Class

#### Parallel session 2

##### Room 231 Amado Mathematics Building

14:30-15:00 Jose Burillo (Barcelona, Spain)  
Density of Coprime and Primitive Elements in Free Groups

15:10-15:40 Gerhard Rosenberger (Dortmund, Germany)  
Tame Almost Primitive Elements

15:40-16:10 

16:10-16:40 Vladimir Shpilrain (New York)  
Whitehead's Algorithm Revised


16:50-17:20 Ted Turner (Albany, New York)  
Test Elements in Groups and on their Boundaries

### Parallel session 3

#### Room 232 Amado Mathematics Building

14:30-15:00 Georgios Tsapogas (Samos, Greece)  
Approximation of Recurrence in Negatively Curved Metric Spaces

15:10-15:40 Gabriel Rosenberg (New York)  
Infinite Towers of Uniform Tree Lattices

15:40-16:10 

16:10-16:40 Claas Roever (Geneva, Switzerland)  
Commensurator Groups of Branch Groups

16:50-17:20 Michel Coornaert (Strasbourg, France)  
Stable Exponents in Discrete Groups

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## Thursday, June 15

### Morning session

#### Butler Auditorium

09:00-09:50 Mark Feighn (Newark, New Jersey)  
The Topology at Infinity of  $\text{Out}(F_n)$

10:00-10:50 Martin Dunwoody (Southampton, England)  
Algorithms for Finding Splittings of Finitely Presented Groups

10:50-11:20 

11:20-12:10 Michael Davis (Columbus, Ohio)  
Vanishing Theorems and Conjectures for the  $L^2$ -Homology of Right-Angled Coxeter Groups


### Afternoon sessions

#### Parallel session 1

##### Butler Auditorium

14:30-15:00 Martin Edjvet (Nottingham, England)  
Cyclic Presentations of the Trivial Group

15:10-15:40 Hamish Short (Marseille, France )  
Subgroups of Direct Products of Free Groups

15:40-16:10 

16:10-16:40 Jim Howie (Edinburgh, Scotland)  
Killing Free Products of Groups


16:50-17:20 Donald Collins (London, England)  
Intersections of Magnus Subgroups of One Relator Groups

#### Parallel session 2

##### Room 232 Amado Mathematics Building

14:30-15:00 David Epstein (Coventry, England)  
Hyperbolic Convex Hulls and a Conjecture in Complex Analysis

15:10-15:40 Roger Fenn (Brighton, England)  
Recent Advances in the Theory of Racks

15:40-16:10 

16:10-16:40 Robert Brooks (Haifa, Israel)  
Trivalent Graphs and Random Riemann Surfaces


16:50-17:20 Kanta Gupta (Winnipeg, Manitoba)  
Some Recent Developments in the Finite Basis Problem

### Parallel session 3

#### Room 233 Amado Mathematics Building

14:30-15:00 Jon McCammond (College Station, Texas)  
The Curvature of Posets Associated to the Braid Groups

15:10-15:40 Kai-Uwe Bux (Salt Lake City, Utah)  
Orbit Spaces of Subgroup Complexes and Combinatorial Morse Theory

15:40-16:10 

16:10-16:40 Kim Ruane (Zurich, Switzerland and Boston, Massachusetts)  
Local Connectivity of Boundaries and Splittings of Groups

16:50-17:20 Michael Mihalik (Nashville, Tennessee)  
Visual Decompositions of Coxeter Groups




### Friday, June 16

#### Morning session

#### Butler Auditorium

09:00-09:50 Martin Bridson (Oxford, England)  
Aspects of Rigidity for  $\text{Out}(F_n)$

10:00-10:50 Ruth Charney (Columbus, Ohio )  
Automorphism Groups of Coxeter Groups

10:50-11:20 

11:20-12:10 Peter Shalen (Chicago, Illinois)  
Smallish Knots in 3-Manifolds

13:00 Weekend Excursion to the Galilee and Golan Heights



### Sunday, June 18


#### Morning session

#### Butler Auditorium

09:00-09:50 Stuart Margolis (Ramat Gan, Israel)  
Inverse Semigroup Theoretic Methods in Combinatorial and Geometric Group Theory

10:00-10:50 Michael Handel (Chicago, Illinois)

Abelian Subgroups of  $\text{Out}(F_n)$

10:50-11:20 

11:20-12:10 John Crisp (Dijon, France and Southhampton, England)  
The Tits Conjecture for Artin Groups, Solved


### Afternoon sessions

#### Parallel session 1

##### Butler Auditorium

14:30-15:00 Sean Cleary (New York)  
Rotation Distance and Thompson's Group F

15:10-15:40 Noel Brady (Norman, Oklahoma)  
On Dimensions of  $\text{CAT}(0)$  and  $\text{CAT}(-1)$  Complexes with the Same Hyperbolic Group Action

15:40-16:10 

16:10-16:40 Inna Bumagina (Jerusalem, Israel )  
Subgroups of Torsion Free Hyperbolic Groups are Hopf


16:50-17:20 Christophe Pittet (Toulouse, France)  
Isoperimetric Inequalities for Lattices

#### Parallel session 2

##### Room 232 Amado Mathematics Building

14:30-15:00 Saar Hersensky (Beer-Sheva, Israel)  
Diophantine Approximation in Negatively Curved Manifolds

15:10-15:40 Elena Klimenko (Haifa, Israel)  
Two-Generator Hyperbolic Orbifolds with Real Parameters

15:40-16:10 

16:10-16:40 Jens Harlander (Frankfurt, Germany)  
Singular 3-Manifolds and Asphericity of Certain Ribbon Disc Complements


16:50-17:20 Andrzej Zuk (Lyon, France)  
To be announced

#### Parallel session 3

##### Room 815 Amado Mathematics Building

14:30-15:00 Grzegorz Gromadzki (Gdansk, Poland)  
Conjugacy Classes of Involutions in  $\mathbb{Z}^2$ -Groups

15:10-15:40 Waldemar Holubowski (Gliwice, Poland)  
Subgroups of Infinite Dimensional Linear Groups Containing a Fixed Subgroup

15:40-16:10 

16:10-16:40 Daniela Nikolova (Sofia, Bulgaria)  
Matrix Equations

16:50-17:20 Andrew Harkins (Newcastle-upon-Tyne, U.K.)  
Polycyclic Subgroups of Automatic Groups are Virtually Abelian

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**Monday, June 19**

### Morning session

#### Butler Auditorium

09:00-09:50 Lee Mosher (Newark, New Jersey)  
On the Geometry of Hyperbolic-by-Free Groups

10:00-10:50 Martin Lustig (Marseille, France)  
Conjugacy and Dynamics of Free Group Automorphisms

10:50-11:20 

11:20-12:10 Alex Lubotzky (Jerusalem, Israel)  
Generating Random Elements in Finite Groups, Kazhdan Property T and Automorphism Groups of Free Groups


### Afternoon sessions

#### Parallel session 1

##### Butler Auditorium

14:30-15:00 Oleg Bogopolski (Novosibirsk, Russia)  
Classification of Automorphisms of the Free Group of Rank 2 by Ranks of Fixed-Point Subgroups

15:10-15:40 Vincent Guirardel (Grenoble, France)  
Measures on Trees and Dynamics of  $\text{Out}(F_n)$  on the Boundary of Outerspace

15:40-16:10 

16:10-16:40 To be announced


16:50-17:20 Enric Ventura (Barcelona, Spain)  
On Automorphism-Fixed Subgroups of a Free Group

#### Parallel session 2

##### Room 232 Amado Mathematics Building

14:30-15:00 Ross Geoghegan (Binghamton, New York)  
 $SL_2$  Groups Acting on the Hyperbolic Plane

15:10-15:40 Olympia Talelli (Athens, Greece)  
On Complete Resolutions

15:40-16:10 

16:10-16:40 Robert Shwartz (Edinburgh, Scotland)  
One-Relator Free Products

16:50-17:20 Seymour Bachmuth (Santa Barbara, California)  
Burnside Groups of Prime-Power Exponents

18:30 Departure for the Conference Banquet at the old Crusader Castle of Yehiam in the Galilee

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### Tuesday, June 20

#### Morning session

##### Butler Auditorium

09:00-09:50 Pierre de la Harpe (Geneva, Switzerland)  
Uniform Growth in Groups of Exponential Growth

10:00-10:50 Frederic Paulin (Orsay, France)  
Non-Archimedean Diophantine Approximation and Group Actions on Trees

10:50-11:20 

11:20-12:10 Daniel Wise (Ithaca, New York)  
Sectional Curvature, Coherence, and Local Indicability


### Afternoon sessions

#### Parallel session 1

##### Butler Auditorium

14:30-15:00 Andy Magid (Norman, Oklahoma)  
Rigid Groups and Deformations of Representations

15:10-15:40 Hyman Bass (Ann Arbor, Michigan)  
Rigidity Properties of Discrete Groups

15:40-16:10 


16:10-16:40 Dan Guralnick (Haifa, Israel)  
Cuts in Peano Continua and Splittings of Groups

#### Parallel session 2

##### Room 231 Amado Mathematics Building

14:30-15:00 Uri Bader (Haifa, Israel)  
Lie Group Actions on Manifolds with Algebraic Structure

15:10-15:40 Bernhard Muehlherr (Dortmund, Germany)  
Normalizers of parabolic subgroups in Coxeter groups

15:40-16:10 

16:10-16:40 Warren Dicks (Barcelona, Spain)  
Hyperbolic Once-Punctured-Torus Bundles


16:50-17:20 Greg Conner (Provo, Utah)  
Fundamental Groups of One-Dimensional Spaces

#### Parallel session 3

##### Room 232 Amado Mathematics Building

14:30-15:00 Kevin Whyte (Salt Lake City, Utah)  
Quasi-Actions on Trees

15:10-15:40 Bert Wiest (Vancouver, British Columbia)  
Quasi-Isometries of  $F_2 \times Z^n$  and  $F_2 \times F_2$

15:40-16:10 

16:10-16:40 Anna Dyubina (Tel Aviv, Israel)  
Geometry of Wreath Products

16:50-17:20 Eric Swenson (Provo, Utah)  
Convex Subgroups of Torsion in  $CAT(0)$  Groups

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### Wednesday, June 21

#### Morning session

##### Butler Auditorium

09:00-09:50 Mladen Bestvina (Salt Lake City, Utah)  
Proper Actions of Lattices on Contractible Manifolds

10:00-10:50 Rostislav Grigorchuk (Jerusalem, Israel and Moscow, Russia)  
Branch and Fractal Groups

10:50-11:20 




11:20-12:10 Robert Gilman (Hoboken, New Jersey)  
Formal Languages and Groups

**Closing session**

**Butler Auditorium**

14:30-15:00 Laurent Bartholdi (Jerusalem, Israel)  
Lie Algebras of Groups Acting on Rooted Trees

15:10-15:40 Marc Bourdon (Vandoeuvre-les-Nancy, France)  
Rigidity of Quasi-Isometries for Some Hyperbolic Buildings

15:40-16:10 

16:10-16:40 Bertrand Remy (Vandoeuvre-les-Nancy, France)  
Classical Properties for Kac-Moody Lattices in Trees and Hyperbolic Buildings

16:50-17:20 Armando Martino (London, England)  
Fixed Subgroups in the Free Group of Rank Three

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