



**Activities at Institut für Mathematische Strukturtheorie  
(formerly Institut für Mathematik C)  
in the reserach group of Wolfgang Woess  
since September 1, 1999**

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1. INTRODUCTION

Before moving to Graz, I had been associate and subsequently (1994) full professor at the University of Milan, Italy, from 1988 to 1999.

When I arrived at Graz, the personnel of the small Institute comprised the secretary, plus an older collaborator with “Habilitation” on a tenured position, plus a younger collaborator whose “Habilitation” and tenure were imminent at that time. Both are not working in my research area. Later on, a third collaborator moved from “Mathematics D” to “Mathematics C”, also with “Habilitation” and tenure. His retirement at the end of 2004 gave me the first opportunity for a “regular” new employment (Dr. Franz Lehner). Up to 2004, I also had the possibility to offer two 50%-employments for younger assistants on a post-doc-level with one-year contracts, and starting with 2004, I could employ a young assistant (Ph.D. student), whose position will expire in 2008.

Under these circumstances, given also the rather heavy teaching duties, it has not been easy to build up a small research group in my area of mathematical work: Random walks on graphs and groups, structure theory of infinite graphs and groups, discrete potential theory, and spectral theory.

Graz, December 21, 2006, W. Woess

## 2. THE RESEARCH GROUP OF W. WOESS AT THE INSTITUTE

### Current team:

Prof. Wolfgang Woess  
 Dr. Franz Lehner (assistant professor)  
 Dr. Florian Sobieczky (FWF project collaborator)  
 Dipl.-Math. Lorenz Gilch (PhD student, assistant position)  
 Dipl.-Ing. Wilfried Huss (PhD student, FWF project collaborator)  
 MSc. Ecaterina Sava (PhD student, NAWI project collaborator)

### Previous collaborators:

Dr. Bernhard Krön (50% assistant position)  
 (PhD student of P.M. Grabner; W. Woess had supervised Krön's master thesis)  
 Dr. Sara Brofferio (FWF & EU curie project collaborator; W. Woess had supervised Brofferio's master thesis)  
 Dr. Ronald Ortner (50% FWF project collaborator + 50% assistant prof. position)  
 Dr. Markus Neuhauser (FWF project collaborator)  
 Dr. Elmar Teufl (tutor, 50% assistant position, FWF project collaborator)  
 Dr. Adam Timar (FWF project collaborator)

## 3. TEACHING

The institute's main teaching duties comprise 1st year Calculus courses for students of Electrical Engineering (every winter and summer semester, 180–320 students) and a course in Discrete Mathematics for 1st year students of Computer Science (every summer semester, 280–380 students), besides varying courses for students of Mathematics.

## 4. RECENT AND CURRENT RESEARCH PROJECTS WITH EXTERNAL FUNDING

### **A. Spectral Problems and Noncommutative Probability Theory**

**FWF (Austrian Science Fund) Schrödinger Return Project Nr. R2Mat**

**1.7.2001 – 30.11.2004<sup>1</sup>**

Project coordinator: Prof. Wolfgang Woess

Fellow: Dr. Franz Lehner (now assistant professor at the same institute)

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<sup>1</sup>Dates are in the format day.month.year

**B. Asymptotic Properties of Random Walks on Graphs**  
**FWF (Austrian Science Fund) Projekt Nr. P15577-N05**

**1.10.2002 – 15.7.2006**

Project coordinator: Prof. Wolfgang Woess

Project personnel: Dr. Sara Brofferio (1.10.2002 – 28.2.2003),

Dr. Ronald Ortner (1.10.2002 – 31.7.2003, now at Montanuniversität Leoben),

Dr. Markus Neuhauser (1.10.2003 – 30.9.2005, then at Universität Göttingen, now Vienna),

Dr. Florian Sobieczky (1.10.2004 – 31.8.2005 and 1.1. – 30.4.2006),

Dr. Elmar Teuffl (1.4.2005 – 30.9.2005, now at Universität Bielefeld)

Dr. Adam Timar (15.1. – 15.7.2006, now at University of British Columbia, Vancouver)

External collaborators: Prof. Laurent Bartholdi (EPFL Lausanne),

Prof. Vadim A. Kaimanovich (Université de Rennes),

Prof. Laurent Saloff-Coste (Cornell University),

Prof. Andrzej Żuk (ENS Lyon)

**C. Internal Diffusion Limited Aggregation**  
**on Non-Homogeneous Structures**

**EU Marie Curie PostDoc fellowship HPMF-CT-2002-02137**

**1.3.2003 – 31.8.2004**

Project coordinator: Prof. Wolfgang Woess

Fellow: Dr. Sara Brofferio (1.3.2003 – 31.8.2004, now Univ. Paris - Orsay)

External collaborator: Dr. Sébastien Blachère (Université de Marseille - I)

**D. Random Walks on Random Partial Graphs of Transitive Graphs**  
**FWF (Austrian Science Fund) Individual Project Nr. P18703-N18**

**1.10.2006 – 30.9.2009**

Project coordinator & personnel: Dr. Florian Sobieczky

**E. Random Walks, Random Configurations, and Horocyclic Products**  
**FWF (Austrian Science Fund) Projekt Nr. P18703-N18**

**1.10.2002 – 15.7.2006**

Project coordinator: Prof. Wolfgang Woess

Project personnel: Dipl.-Ing. Wilfried Huss (PhD student)

Dr. James Parkinson (starting with autumn 2007)

External collaborators: Dr. Sara Brofferio (Université de Paris-Orsay),

Prof. Laurent Bartholdi (EPFL Lausanne),

Prof. Donald Cartwright (University of Sydney)

Prof. Vadim A. Kaimanovich (International University Bremen),

Prof. Laurent Saloff-Coste (Cornell University).

## 5. ORGANISATION OF CONFERENCES

(1) **2001 - Random Walks in Vienna**

Special semester at Erwin Schrödinger Institut, Vienna, February – July 2001.

Organizers: Vadim Kaimanovich (Rennes), Klaus Schmidt (Vienna), Wolfgang Woess (Graz).

<http://www.math.tugraz.at/~woess/rwalk2001.html>

(2) **Fractals in Graz 2001** (Analysis - Dynamics - Geometry - Stochastics)

TU Graz, 4.–9.6.2001. Approx. 90 participants.

Organizers: Peter Grabner, Wolfgang Woess (Graz).

<http://finanz.math.tu-graz.ac.at/~fractal/>

(3) **8th Meeting of the Austrian Mathematical Society**

Joint Conference in Cooperation with SIMAI and UMI, Bozen (Bolzano), 22.–26.9.2003

W. Woess Member of program committee.

<http://www1-c703.uibk.ac.at/oemgneu/>

(4) **Geometric Group Theory, Random Walks, and Harmonic Analysis**

Conference in Cortona, Italy, 13.–19.6.2004, Approx. 90 participants.

Organizers: Tullio Ceccherini-Silberstein (Benevento), Maura Salvatori (Milano), Laurent Saloff-Coste (Cornell Univ.), Tatiana Smirnova-Nagnibeda (Geneva), Wolfgang Woess (TU Graz)

<http://www.math.tugraz.at/~cortona/>

(5) **2nd Joint Meeting of AMS, DMV, ÖMG**

Mainz, Germany, 16.–19.6.2005

Special session “Stochastic Analysis on Metric Spaces”

Organizers: Laurent Saloff-Coste (Cornell Univ.), Karl-Theodor Sturm (Bonn), Wolfgang Woess (TU Graz)

<http://www.math.tugraz.at/~woess/mainz2005>

(6) **RDSSES/ESI Educational Workshop on Discrete Probability**

Erwin Schrödinger Institute, Vienna, 13.–24.3.2006

Organizers: Vadim A. Kaimanovich (Bremen), Klaus Schmidt (Vienna), Wolfgang Woess (TU Graz)

<http://www.math.tugraz.at/mathc/esi2006/>

(7) **Boundaries**

TU Graz, 6.–10.7.2009

Organizer: Wolfgang Woess (TU Graz)

This workshop is part of “**GROUPS**” – **European Training Courses in Group Theory** (Geometric, Analytic and Ergodic Aspects of Group Theory),

EU Marie Curie contract MSCF-CT-2006-045987

Coordinator: Hamish Short (Marseille)

## 6. PROCEEDINGS VOLUMES

- [1] P. M. A. Grabner, W. Woess (editors): *Fractals in Graz 2001: Analysis - Dynamics - Geometry - Stochastics*, Proceedings (Graz 2001), Birkhäuser, Basel, 283+iii pages, 2003.
- [2] V. A. Kaimanovich with K. Schmidt and W. Woess (editors): *Random Walks and Geometry*, Proceedings (ESI, Vienna, 2001), de Gruyter, Berlin, 532+x pages, 2004.

## 7. REFEREEING (W. WOESS)

In the period since 2000, W. Woess has acted as a referee for papers submitted to the following journals:

Abhandlungen des Mathematischen Seminars der Universität Hamburg;  
 Advances in Applied Mathematics;  
 Annales Blaise Pascal;  
 Annales de l'Institut Fourier (Grenoble);  
 Annales de l'Institut Poincaré -B;  
 Annali di Matematica Pura ed Applicata;  
 Annals of Probability;  
 Bollettino dell'Unione Matematica Italiana;  
 Bulletin of the London Mathematical Society;  
 Bulletin de Sciences Mathématiques;  
 Circuits, Systems, and Signal Processing;  
 Combinatorics, Probability, and Computing;  
 Computing;  
 Contemporary Mathematics;  
 Discrete and Computational Geometry;  
 Discrete Mathematics;  
 Discussiones Mathematicae;  
 Electronic Communications in Probability;  
 Electronic Journal of Probability;  
 Glasgow Mathematical Journal;  
 Illinois Journal of Mathematics;  
 International Journal of Mathematics and Mathematical Sciences;  
 International Mathematical Research Notes;  
 Journal of Algebraic Combinatorics;  
 Journal of Combinatorial Theory-B;  
 Journal of Functional Analysis;  
 Journal of Graph Theory;  
 Journal of Group Theory;  
 Journal of Lie Theory;  
 Journal of the London Math. Society;  
 Journal of Mathematical Analysis and Applications;  
 Journal of Theoretical Probability;  
 Linear and Multilinear Algebra;  
 Mathematics and Computer Science;

Mathematische Annalen;  
 Mathematische Nachrichten;  
 Monatshefte für Mathematik;  
 Nagoya Mathematical Journal;  
 Potential Analysis;  
 Probability Theory and Related Fields;  
 Proceedings of the London Math. Society;  
 Random Structures and Algorithms;  
 Transactions of the American Mathematical Society.

Refereeing of

Cofin grant applications (Italy, comparable with NSF grants),  
 EU Marie Curie fellowship application,  
 Israel Science Foundation research proposal,  
 DFG project application (Germany).

External committees: Committee for prof. position, Univ. Neuchatel, Switzerland

PhD committees at Univ. Paris 6 and Scuola Normale Superiore Pisa.

#### 8. ORGANISATIONAL DUTIES (W. WOESS)

Secretary of the Austrian Mathematical Society, 2000–2003.

Coordinator of the Key Research Area (“Forschungsschwerpunkt”) “Algorithms and Mathematical Modelling” of TU Graz since 2004.

Coordinator (“Vorsitzender”) of the committee (“Curriculakommission”) for doctoral studies at TU Graz since 2005.

#### 9. ERASMUS/SOCRATES-EXCHANGE OF THE EU

Launching of and participation in Erasmus/Socrates exchange programmes between TU Graz and Università di Milano, resp. Université Marseille-I.

#### 10. GUESTS OF THE RESEARCH GROUP

The following guests stayed for a week or longer.

*Winter semester 1999/2000:*

Visiting lecturer Dr. Tatiana Smirnova-Nagnibeda (KTH Stockholm) [financial support: TU Graz]

*Summer semester 2000:*

Visiting prof. Donald Ian Cartwright (University of Sydney) [financial support: TU Graz]

*Winter semester 2000/2001:*

Visiting prof. Dr. Tullio Ceccherini-Silberstein (Università degli Studi del Sannio di Benevento) [financial support: TU Graz]

Dr. Daniela Bertacchi (Università degli Studi di Milano) [financial support: Arge Alps Adria]

*Summer semester 2001:*

Visiting prof. Vadim A. Kaimanovich (Université de Rennes 1) [financial support: TU Graz]

Dr. Daniela Bertacchi (Università degli Studi di Milano) [financial support: Consiglio Nazionale delle Ricerche]

Visiting prof. Dr. Maura Salvatori (Università degli Studi di Milano) [financial support: Socrates/ Erasmus-exchange, EU]

*Winter semester 2001/2002:*

Visiting prof. Dr. Tatiana Smirnova-Nagnibeda (KTH Stockholm) [financial support: TU Graz]

*Summer semester 2002:*

Visiting prof. Dr.phil. BSc. Rögnvaldur G. Möller (University of Iceland) [financial support: TU Graz]

*Winter semester 2002/2003:*

Prof. Dr. Vadim A. Kaimanovich (Université de Rennes 1) [financial support: Austrian Science Fund FWF]

Prof. Dr. Maura Salvatori (Università degli Studi di Milano) [financial support: Socrates/Erasmus-exchange, EU]

Visiting prof. Dr. Laurent Saloff-Coste (Cornell University) [financial support: TU Graz]

*Summer semester 2003:*

Prof. Dr. Dimitri Petritits (Université de Rennes 1) [financial support: Socrates/Erasmus-exchange, EU]

Dr. Laurent Bartholdi (UC at Berkeley) [financial support: Austrian Science Fund FWF]

*Winter semester 2003/2004:*

Prof. Dr. Zoran Vondracek (Universität Zagreb) [financial support: TU Graz]

Prof. Dr. Maura Salvatori (Università degli Studi di Milano) [financial support: Cofin, Italy]

*Summer semester 2004:*

Visiting prof. Dr. Andrzej Zuk (ENS Lyon) [financial support: TU Graz]

Dr. Sebastien Blachère (Université de Marseille 1) [financial support: EU Curie fellowship HPMF-CT-2002-02137 of S. Brofferio]

*Winter semester 2004/2005:*

Prof. Dr. Ken Dykema (Texas A & M University)

Prof. Vadim A. Kaimanovich (Université de Rennes 1) [financial support: Socrates/Erasmus, EU]

Prof. Anders Karlsson (KTH Stockholm) [financial support: RDSES program, European Science Foundation ESF]

Dr. Laurent Bartholdi (EPFL Lausanne) [financial support: TU Graz]

*Summer semester 2005:*

Dr. Sebastien Blachère (Université de Marseille 1) [financial support: RDSES program, European Science Foundation ESF]

Dr. Sara Brofferio (Université de Paris-Orsay) [financial support: EU Curie fellowship HPMF-CT-2002-02137]

Prof. Christophe Pittet (Université de Marseille 1) [financial support: Socrates/Erasmus-exchange, EU]

Visiting prof. Donald Ian Cartwright (University of Sydney) [financial support: TU Graz]

*Academic year 2005/2006:*

Visiting prof. Dr. Maura Salvatori (Università degli Studi di Milano, on sabbatical leave) [partial financial support: TU Graz]

*Winter semester 2005/2006:*

Visiting prof. Vadim A. Kaimanovich (International University Bremen) [financial support: TU Graz]

*Summer semester 2005:*

Prof. Nina Gantert (Universität Münster) [financial support: RDSES program, European Science Foundation ESF]

*Winter semester 2006/2007:*

Dr. (in spe) Sebastian Müller (Universität Münster) [financial support: RDSES program, European Science Foundation ESF]

## 11. TALKS AND LECTURES IN THE STRUCTURE THEORY SEMINAR (STRUKTURTHEORIE-SEMINAR)

### 1999

- 1999-11-26: Prof. Vadim A. Kaimanovich (Rennes): *The Sierpinski Gasket and Hyperbolicity: an Application to Random Walks*
- 1999-11-26: Prof. Tullio Ceccherini-Silberstein (Benevento): *The Garden of Eden Theorem for Cellular Automata*
- 1999-11-26: Dr. Tatiana Smirnova-Nagnibeda: *Nonamenable Groups and Percolation*

### 2000

- 2000-05-12: Dr. Rögnvaldur G. Mller (Reykjavik): *Structure of totally disconnected groups, graphs and permutations*
- 2000-05-30: Dr. Franz Lehner (Paris): *ber Spektralberechnung und freie Wahrscheinlichkeitstheorie*
- 2000-07-04: Prof. Anatoly Vershik (St. Petersburg): *An approach to the uniform distributions on exponential groups*
- 2000-09-28: Dr. Laurent Bartholdi (Genf): *Co-Wachstum von Gruppen und Spektra von Irrfahrten*
- 2000-12-04: Prof. Tullio Ceccherini-Silberstein (Benevento): *Inner amenability of the Richard Thompson group  $F$*
- 2000-12-11: Dr. Daniela Bertacchi (Milano/Graz): *Uniform estimates of transition probabilities on the 2-comb*

### 2001

- 2001-03-13: Prof. Barry Hughes (Melbourne): *Continuous time random walks*
- 2001-03-20: Prof. Maura Salvatori (Milano): *Multivariate spline frames*
- 2001-06-27: Prof. Paul-Jean Cahen (Marseille): *Integer-valued polynomials*

- 2001-10-30: Dipl.-Math. Ali nl (Graz): *Some mathematical annotations to the correlational agreement coefficient  $CA(<, D)$*
- 2001-10-31: Dr. Franz Lehner (Graz): *Good formula for non-commutative cumulants*
- 2001-11-07: Dr. Tatiana Smirnova-Nagnibeda (Stockholm): *Ergodic properties of boundary actions*

## 2002

- 2002-03-08: Dr. Ronald Ortner (Salzburg): *Arrangement von Pseudokreisen*
- 2002-06-07: Prof. Martin Goldstern (Wien): *Ein starker Ramsey-Satz, und die Konsistenz der Peano-Arithmetik*
- 2002-08-27: Prof. Aljosa Volcic (Trieste): *The solution of the covariogram problem for plane  $C_+^2$  convex bodies*
- 2002-10-07: Prof. Vadim Kaimanovich (Rennes): *Boundary amenability of hyperbolic spaces*
- 2002-10-11: Prof. Vadim Kaimanovich (Rennes): *Random walks with random transition probabilities*
- 2002-10-18: Prof. Maura Salvatori (Milano): *Growth at infinity and behavior of the Laplacian on graphs*
- 2002-11-08: Dr. Sara Brofferio (Paris/Graz): *Stability of the auto-regressive model in the critical case, and random walks on the affine group*
- 2002-11-15: Dr. Anna Erschler (IHES, Bures-sur-Yvette): *Boundary behaviour of groups of subexponential growth*
- 2002-11-29: Prof. Anatoly Vershik (St. Petersburg): *Universality and randomness*
- 2002-12-11: Dr. Daniela Bertacchi (Milano): *Gaussian random fields: entropic repulsion and the role of extrema*

## 2003

- 2003-01-24: Prof. Laurent Saloff-Coste (Ithaca, N.Y.): *Random walks on groups: classic and exotic behaviour*
- 2003-02-04: Dr. Sara Brofferio (TU Graz): *Renewal theory on trees*
- 2003-02-05: Dipl.Math. Ali Ünlü (Univ. Graz): *Assoziationsmae fr die Vorhersagbarkeit von Lösbarkeitsabhängigkeiten zwischen dichotomen Items*
- 2003-03-07: Prof. Tomaz Pisanski (Laibach): *Graphs on the ceilings of Gothic churches*
- 2003-03-28: Prof. Brigitte Servatius (Worcester Polytechnic, MA): *Combinatorial pointed pseudo-triangulations*
- 2003-04-04: Prof. Martin Aigner (Berlin): *Volumen, Polyeder und Primzahlen - ein kombinatorischer Blick*, Kolloquium anlich des 60. Geburtstagstages von Prof. Rainer Burkard (veranstaltet von R. Tichy und W. Woess)
- 2003-04-09 bis 2003-04-11: Kolloquium ber Wahrscheinlichkeitstheorie und Statistik (aus Anlass des Dienstantrittes von Prof. István Berkes)
- 2003-05-05: Prof. Norbert Seifert (Montanuniversitt Leoben): *Hochsymmetrische gerichtete Graphen*
- 2003-05-15: Dr. Markus Neuhauser (Neuchatel): *Wachstum von Gruppenelementen und die Bass-Vermutung*
- 2003-05-19: Prof. Dimitri Petritis (Rennes): *Random walk in random environment*, Minivorlesung

- 2003-05-22: Prof. Dimitri Petritis (Rennes): *Random walk in random environment on a multiplexed tree*
- 2003-06-11: Prof. Vladimir I. Trofimov (Ekaterinburg): *Geometric group theory and its applications*
- 2003-06-26: Dr. Laurent Bartholdi (Berkely): *The basilica group is amenable*
- 2003-10-08: Prof. Zoran Vondracek (Zagreb): *Ruin probabilities for general perturbed risc processes*
- 2003-10-23: Dr. Markus Neuhauser (Graz): *Nachbarschaftsgraphen von Cayley-Graphen endlich-erzeugter Gruppen*

## 2004

- 2004-03-05: Prof. Andrzej Zuk (ENS Lyon): *On the Ihara zeta function for groups and integrable dynamical systems*
- 2004-05-07: Prof. Dr. Tullio Ceccherini-Silberstein (Benevento): *Expander graphs and the Zig-Zag product*
- 2004-03-11: Prof. Dr. Klaus Schmidt (ESI und Univ. Wien): *Quasihyperbolische Automorphismen des Torus und ihre invarianten Maße*
- 2004-06-24: Dr. Bernhard Burgstaller (Univ. Linz): *Higher rank Cuntz-Krieger Algebras*
- 2004-07-15: Dr. Florian Sobieczky (TU Berlin): *About the number of connected components of inverse images of stationary, ergodic fields*
- 2004-07-15: Dr. Sebastien Blachère (Univ. de Provence, Marseille): *Internal diffusion limited agregation*
- 2004-09-09: Prof. Dr. Vadim A. Kaimanovich (Rennes): *Self-similarity and amenability*
- 2004-09-10: Prof. Dr. Vadim A. Kaimanovich (Rennes): *Random walks with maximal entropy on free products*
- 2004-11-15: Dr. Anders Karlsson (KTH Stockholm): *Laws of large numbers for random walks*
- 2004-11-29: Dr. Laurent Bartholdi (EPF Lausanne): *Insanely twisted rabbits*
- 2004-12-13: Dr. Daniela Bertacchi (Univ. Milano – Bicocca): *Asymptotic behaviour of the simple random walk on the 2-dimensional comb*

## 2005

- 2005-01-21: Prof. Dr. Ken Dykema (Texas A&M University): *Multiplication of free random variables*
- 2005-05-11 and 2005-05-12: Prof. Christophe Pittet (Univ. Aix-Marseille 1): *Minicourse Random walks and isoperimetry on finitely generated groups*
- 2005-05-31: Prof. Brigitte Servatius (Worcester Polytechnic, MA): *Starrheit und globale Starrheit von Graphen* (jointly organized with F. Aurenhammer, IGI, TU Graz)
- 2005-06-01: Dr. Florian Sobieczky (TU Graz): *Irrfahrten auf endlichen perkolativen Teilgraphen von transitiven Graphen*
- 2005-06-10: Prof. Dr. Wolfgang Woess (TU Graz): *Horocyclic products of trees, rings of Laurent series, and valuations*
- 2005-07-01: Dipl.-Ing. Dr. Franz Lehner (TU Graz): *Spektralberechnung auf freien Gruppen* [Habilitation Colloquium]
- 2005-10-07: Dipl.-Math. Lorenz Gilch (TU Graz): *Lamplighter random walks on trees*

- 2005-12-16: Prof. Dr. Herbert Heyer (Univ. Tübingen): *Polynomielle Faltungsstrukturen über kompakten Mengen und Anwendungen in der Wahrscheinlichkeitstheorie* [talk in the Mathematical Colloquium]

## 2006

- 2006-01-20: Prof. Dr. Vadim A. Kaimanovich (International University Bremen): *Random walks with maximal entropy*
- 2006-01-20: Dr. Adam Timar (Indiana Univ., Bloomington, and TU Graz): *Neighbouring clusters in Bernoulli Percolation*
- 2006-03-10: Dr. James Parkinson (University of Sydney): *Isotropic random walks on affine buildings*
- 2006-03-09: Dr. Adam Timar (TU Graz): *Cut sets in infinite transitive graphs*
- 2006-03-23: The following public talk at *math.space*, Vienna, was co-organized by W. Woess: Prof. Persi Diaconis (Stanford Univ.): *Mathematics and Magic Tricks*
- 2006-04-04: Dr. Florian Sobieczky (TU Graz): *Amenability of equivalence relations and graphs*
- 2006-04-20: Dr. Ivan Veselic (TU Chemnitz): *Anderson-percolation Hamiltonians and compactly supported eigenstates*
- 2006-04-21: Dr. Daniel Lenz (TU Chemnitz): *Gleichmäßige Existenz der integrierten Zustandsdichte*
- 2006-05-10: Dr. Adam Timar (TU Graz): *Conformal invariance and critical percolation in the plane* (after Stanislav Smirnov)
- 2006-05-12: Prof. Dr. Vincenzo Capasso (Univ. Milano): *On the stochastic geometry of birth-and-growth processes* [talk in the Mathematical Colloquium]
- 2006-05-18: Dr. Adam Timar (TU Graz): *A short proof of Kesten's theorem on critical percolation in dimension two* (after Bollobas and Riordan)
- 2006-05-22: Dr. Elmar Teufl (Univ. Bielefeld): *Spannende Bäume und Widerstand auf selbst-ähnlichen Graphen*
- 2006-06-07: Prof. Dr. Nina Gantert (Univ. Münster): *Recurrence and transience of branching Markov chains*
- 2006-06-07: Dr. Florian Sobieczky (TU Graz): *Amenabilität von horozyklischen Produkten zufälliger Bäume*
- 2006-06-22: Dr. Ulrich Haböck (Univ. Wien): *Recurrence of the twisted planar random walk*
- 2006-10-06: Dr. (in spe) Sebastian Müller (Univ. Münster): *The faces of Branching Markov Chains*
- 2006-11-22: Dr. (in spe) Tonci Antunovic (TU Chemnitz): *Asymptotic behavior of the integrated density of states on Cayley graphs*
- 2006-11-17: Prof. Dr. Silke Rolles (TU München): *Edge-reinforced random walk - recent progress and open problems*
- 2006-11-30: Prof. Dr. Norbert Seifert (Montanuniversität Leoben): *Erreichbarkeitsrelationen in gerichteten Graphen*
- 2006-12-06: Dr. Markus Neuhauser (Univ. Wien): *Neue Gegenbeispiele zur starken Atiyah-Vermutung*
- 2006-12-18: Prof. Dr. Franz Halter-Koch (Univ. Graz): *Nicht-eindeutige Faktorisierungen* [talk in the Mathematical Colloquium]

## 12. TALKS AT CONFERENCES BY MEMBERS OF THE RESEARCH GROUP

- (1) W. Woess: *Graphen und nicht-unimodulare Gruppen*, Kolloquium über Analysis, TU Wien (Austria), 10–11 March 2000.
- (2) W. Woess: *The exact asymptotic behaviour of transition probabilities on the Sierpinski graph*, invited talk, Workshop on “Graph Theory and Statistical Mechanics”, Trieste (Italy), 22–25 June 2000.
- (3) W. Woess: *Beschränkte harmonische Funktionen auf unendlichen Graphen*, Tagung “10 Jahre Zahlentheoretisches Kolloquium in Graz”, TU Graz (Austria), 21–30 June 2000.
- (4) B. Krön: *Das Spektrum selbstähnlicher Graphen*, Jahrestagung der Deutschen Mathematiker-Vereinigung, Dresden, 18–22 September 2000.
- (5) B. Krön: *Julia-sets of rational Functions and the spectrum of self-similar graphs*, CIRM, Marseille-Luminy (France), February 2001.
- (6) W. Woess: *Beschränkte harmonische Funktionen auf transitiven Graphen*, Festkolloquium aus Anlass des 60. Geburtstages von Prof. Imrich, Montanuniv. Leoben, 1 June 2001.
- (7) F. Lehner: *Berechnung von Spektren auf freien Produkten von Gruppen und  $C^*$ -Algebren*, 15. Kongress der Österreichischen Mathematischen Gesellschaft, Wien, 16–22 September 2001.
- (8) W. Woess: *Über das Wachstum kontextfreier Sprachen*, 15. Kongress der Österreichischen Mathematischen Gesellschaft, Wien, 16–22 September 2001.
- (9) W. Woess: *Growth-sensitivity of context-free languages*, invited talk, Recent Trends in Graph Theory, Algebraic Combinatorics, and Graph Algorithms, Bled (Slovenia), 24–28 September 2001.
- (10) W. Woess: *Generating function techniques for random walks on graphs*, series of invited talks (17 April – 2 May 2002) in the special trimester “Heat Kernels, Random Walks & Analysis on Metric Spaces”, Centre Emile Borel, Paris (France), April–July 2002.
- (11) F. Lehner: *A Good formula for noncommutative cumulants*, Conference “Quantum Probability and related topics”, Levico (Italy), 10–15 June 2002.
- (12) W. Woess: *Transition operators on co-compact  $G$ -spaces, and a theorem of Brooks*, invited talk, conference “Analysis on Graphs and Metric Spaces”, Institut Henri Poincaré, Paris (France), 26–28 June 2002.
- (13) F. Lehner: *A Good formula for noncommutative cumulants*, Conference on “Non-commutative phenomena and random matrices”, PIMS, Vancouver (Kanada) 6–9 August 2002.
- (14) F. Lehner: *Noncommutative cummulants and characterizations of generalized Gaussian random variables*, Workshop on “Random Matrices and Related Topics”, Sandbjerg (Denmark) 13–17 January 2003.
- (15) S. Brofferio: *Renewal theory on an oriented tree*, conference on “Probability Theory on Algebraic-Topological Structures”, Bommerholz (Germany), 3–7 March 2003.
- (16) W. Woess: *Lamplighter-Irrfahrten und harmonische Funktionen*, Kolloquium über Wahrscheinlichkeitstheorie und Statistik, TU Graz, 9–11 April 2003.
- (17) S. Brofferio: *Renewal theory on the oriented tree*, International Conference on Group Theory, Gaeta (Italy), 1–6 June 2003.
- (18) W. Woess: *Lamplighters, Diestel-Leader graphs, random walks, and a quasi-isometry problem*, International Conference on Group Theory, Gaeta (Italy), 1–6 June 2003.
- (19) W. Woess: *Harmonic functions on lamplighter graphs*, 8. Österreichisches Mathematikertreffen, Nachbarschaftstagung in Kooperation mit SIMAI und UMI, Bozen (Italy), 22–26 September 2003.

- (20) F. Lehner: *Noncommutative probability and spectral computations on discrete groups*, 8. Österreichisches Mathematikertreffen, Nachbarschaftstagung in Kooperation mit SIMAI und UMI, Bozen (Italy), 22–26 September 2003.
- (21) W. Woess: *Transition operators on co-compact  $G$ -spaces*, invited talk, Workshop on Groups, Geometry and Dynamics (in memory of Bob Brooks), Technion, Haifa (Israel), 5–9 January 2004.
- (22) S. Brofferio: *Frontiera di Poisson delle trasformazioni affini a coefficienti razionali*, Conference on “Geometria algebrica ed aritmetica”, Padova (Italy), 7–9 January 2004.
- (23) M. Neuhauser: *The metaplectic representation on finite Heisenberg groups*, Third Viennese Gabor Workshop, Univ. Vienna (Austria), 10–12 May 2004.
- (24) S. Brofferio: *The Poisson boundary of random rational affinities*, Conference on “Théorie Ergodique des Actions de Groupes”, Orléans (France), 23–25 May 2004.
- (25) S. Brofferio: *Martin boundary for Diestel-Leader graphs and lamplighter groups*, Conference on “Géométrie et Analyse sur les Structures Aléatoires”, Lille (France), 25–28 May 2004.
- (26) S. Brofferio: *The Poisson boundary of random rational affinities*, Conference on “Geometric Group Theory, Random Walks, and Harmonic Analysis”, Cortona (Italy), 13–19 June 2004.
- (27) F. Lehner: *A noncommutative version of De Finetti’s theorem*, Conference on “Geometric Group Theory, Random Walks, and Harmonic Analysis”, Cortona (Italy), 13–19 June 2004.
- (28) M. Neuhauser: *Relative property (T) and related properties of wreath products*, Conference on “Geometric Group Theory, Random Walks, and Harmonic Analysis”, Cortona (Italy), 13–19 June 2004.
- (29) W. Woess: *Non-backtracking random walks and cogrowth of graphs*, Conference on “Geometric Group Theory, Random Walks, and Harmonic Analysis”, Cortona (Italy), 13–19 June 2004.
- (30) W. Woess: *Lamplighter random walks*, Third Colloquium on Mathematics and Computer Science, TU Vienna (Austria), 13–17 September 2004 (Talk within the Special Day for Helmut Prodinger).
- (31) F. Lehner: *A free version of De Finetti’s theorem*, Workshop “Free probability theory”, BIRS, Banff (Canada), 09–14 October 2004.
- (32) F. Sobieczky: *Annealed return probability of a random walk on a stationary random partial graph of the Cayley graph of an amenable group*, Workshop on “Self-similar Random Structures, Hausdorff Dimension and Branching”, EURANDOM, Eindhoven (The Netherlands) 14–18 March, 2005.
- (33) Elmar Teufel: *Simple random walk on fractal-like graphs*, Workshop on “Self-similar Random Structures, Hausdorff Dimension and Branching”, EURANDOM, Eindhoven (The Netherlands) 14–18 March, 2005.
- (34) F. Lehner: *A free analogue of Brillinger’s formula*, Workshop “Free Probability Theory”, Oberwolfach (Germany) 27 March–2 April 2005.
- (35) W. Woess: *Non-backtracking random walks and cogrowth of graphs*, XXV Conferenza di Analisi armonica, Bologna (Italy), 6–9 April 2005.
- (36) M. Neuhauser: *Heat kernels on cyclic groups*, Workshop “Group theoretical methods, operator theory, and non-orthogonal expansions”, Erwin Schrödinger Institute, Vienna (Austria), 10–22 April 2005.

- (37) M. Neuhauser: *Explicit construction of the metaplectic representation for finite cyclic groups*, Conference on “Modern methods of time-frequency analysis”, Strobl (Austria), 22–27 May 2005.
- (38) F. Lehner: *A noncommutative version of De Finetti’s theorem*, Workshop “Quantum chaos, random matrices and their applications”, Bielefeld (Germany), 23–25 May 2005.
- (39) Elmar Teufl: *Simple random walk on a class of fractal-like trees*, special session “Stochastic Analysis on Metric Spaces”, invited talk, 2nd joint meeting AMS - DMV - ÖMG, Mainz (Germany), 16–19 June 2005.
- (40) W. Woess: *Horocyclic products of trees*, International Conference “Asymptotic and Probabilistic Methods in Group Theory”, Geneva (Switzerland), 20–25 June 2005.
- (41) F. Sobieczky: *Random Walks on the finite components of random partial graphs of transitive graphs*, First Cornell Summer School in Probability (NSF), Cornell, Ithaca, NY (USA), 10–23 July 2005.
- (42) W. Woess: *Horozyklische Produkte von Bäumen*, 16. Internationaler Kongress der Österreichischen Mathematischen Gesellschaft, Klagenfurt, 18–23 September 2005.
- (43) W. Woess: *The spectrum of the averaging operator on a network*, workshop “Heat Kernels, Stochastic Processes and Functional Inequalities”, Oberwolfach (Germany), 27 November–3 December 2005.
- (44) F. Lehner: *Characterizations of noncommutative Gaussian distributions*, Workshop on “Limit Theorems and Characterization Problems in Statistics and Probability”, Bielefeld (Germany), 5–7 December 2005.
- (45) F. Lehner: *Noncrossing cumulants and De Finetti’s theorem*, RDSES/ESI Educational Workshop on Discrete Probability, Erwin Schrödinger Institute, Vienna (Austria), 13–25 March 2006.
- (46) A. Timar: *Neighboring clusters in Bernoulli percolation*, RDSES/ESI Educational Workshop on Discrete Probability, Erwin Schrödinger Institute, Vienna (Austria), 13–25 March 2006.
- (47) E. Teufl: *Spectral dimension and the number of spanning trees of fractal graphs*, RDSES/ESI Educational Workshop on Discrete Probability, Erwin Schrödinger Institute, Vienna (Austria), 13–25 March 2006.
- (48) F. Sobieczky: *Anchored expansion of products of random trees*, RDSES/ESI Educational Workshop on Discrete Probability, Erwin Schrödinger Institute, Vienna (Austria), 13–25 March 2006.
- (49) A. Timar: *Neighboring clusters in Bernoulli percolation*, AMS Meeting, San Francisco, 29–30 April 2006.
- (50) W. Woess: *Horocyclic products of trees*, Minisymposium “Symmetries of finite and infinite graphs”, Montanuniv. Leoben (Austria), 19 May 2006.
- (51) F. Sobieczky: *Anchored isoperimetry of products of trees*, 9th International Vilnius Conference on Probability Theory and Statistics Vilnius (Lithuania), 25–30 June 2006.
- (52) W. Woess: *Martin compactification of random walks on the lamplighter group*, invited talk, Journées “Marches Aléatoires sur les graphes et les groupes”, Univ. Tours (France), 3–5 July 2006
- (53) W. Woess: *Lamplighter random walks on trees*, invited talk, Fourth Colloquium on Mathematics and Computer Science, Univ. Nancy (France), 18–22 September 2006.
- (54) F. Lehner: *A noncrossing basis for noncommutative invariants*, Workshop “Free Probability Theory”, Bielefeld (Germany), 8–9 November 2006.

## 13. PUBLICATIONS OF THE RESEARCH GROUP'S MEMBERS AND COAUTHORS (SINCE 2000)

- [1] W. Huss: *Internal diffusion-limited aggregation on comb lattices: simulation and experimental analysis*, in preparation, TU Graz.
- [2] L. Saloff-Coste and W. Woess: *Computations of spectral radii on cocompact  $G$ -spaces*, in preparation, TU Graz.
- [3] M. Peigné and W. Woess: *On recurrence of reflected random walk on the half-line*, in preparation, Univ. Tours & TU Graz.
- [4] B. Steinsky and E. Teufl: *Random walk on nice trees*, in preparation, TU Graz.
- [5] E. Teufl und S. Wagner: *Enumeration problems for classes of self-similar of graphs*, preprint, TU Graz (2006).
- [6] L. Bartholdi, M. Neuhauser and W. Woess: *Horocyclic products of trees*, preprint, TU Graz (2006).
- [7] L. Gilch: *Rate of escape of lamplighter random walks on trees*, preprint, TU Graz (2006).
- [8] F. Sobieczky: *Random walks on the finite components of random partial graphs of transitive graphs*, preprint, TU Graz (2005).
- [9] L. Gilch: *Rate of escape of random walks on free products*, **Journal of the Australian Mathematical Society**, to appear.
- [10] S. Blachère and S. Brofferio: *Internal diffusion limited aggregation on groups having exponential growth*, **Probability Theory and Related Fields**, to appear.
- [11] A. Karlsson and W. Woess: *The Poisson boundary of lamplighter random walks on trees*, **Geometriae Dedicata**, to appear.
- [12] A. Timar: *Percolation on nonunimodular graphs*, **Annals of Probability**, to appear.
- [13] D. I. Cartwright and W. Woess: *The spectrum of the averaging operator on a network (metric graph)*, **Illinois Journal of Mathematics**, to appear.
- [14] M. Bozejko, K. Dykema and F. Lehner: *Isomorphisms of Cayley graphs of surface groups*, **Algebra Discrete Mathematics**, to appear
- [15] R. Ortner and W. Woess: *Non-backtracking random walks and cogrowth of graphs*, **Canadian Journal of Mathematics**, to appear.
- [16] L. Saloff-Coste and W. Woess: *Transition operators on co-compact  $G$ -spaces*, **Revista Matemática Iberoamericana**, to appear.
- [17] S. Brofferio: *The Poisson boundary of finitely generated groups of rational affinities*, **Journal of Mathematical Sciences (New York)**, to appear.
- [18] S. Brofferio: *The Poisson boundary of random rational affinities*, **Annales de l'Institut Fourier (Grenoble)** **56** (2006) 499–515.
- [19] S. Brofferio and W. Woess: *Positive harmonic functions for semi-isotropic random walks on trees, lamplighter groups, and DL-graphs*, **Potential Analysis** **24** (2006) 245–265.
- [20] A. Karlsson and M. Neuhauser: *Heat kernels, theta identities, and zeta functions on cyclic groups*, **Contemporary Mathematics** **394** (2006), 177–189.
- [21] M. Neuhauser: *Kazhdan constants for compact groups*, **Journal of the Australian Mathematical Society** **81** (2006), 11–14.
- [22] W. Woess: *A note on the norms of transition operators on lamplighter graphs and groups*, **International Journal of Algebra and Computation** **15** (2005) 1261–1272.
- [23] F. Lehner: *Cumulants in noncommutative probability theory III. Creation- and annihilation operators on Fock spaces*, **Infinite Dimensional Analysis, Quantum Probability and Related Topics** **8** (2005) 407–437.

- [24] S. Brofferio and W. Woess: *Green kernel estimates and the full Martin boundary for random walks on lamplighter groups and Diestel-Leader graphs*, **Annales de l'Institut H. Poincaré (Probab. & Stat.)** **41** (2005) 1101–1123.
- [25] M. Neuhauser: *Relative property (T) and related properties of wreath products*, **Mathematische Zeitschrift** **251** (2005) 167 - 177.
- [26] L. Bartholdi and W. Woess: *Spectral computations on lamplighter groups and Diestel-Leader graphs*, **Journal of Fourier Analysis and Applications** **11** (2005) 175–202.
- [27] W. Woess: *Lamplighters, Diestel-Leader graphs, random walks, and harmonic functions*, **Combinatorics, Probability & Computing** **14** (2005) 415–433.
- [28] S. Brofferio: *Renewal theory on the affine group of an oriented tree*, **Journal of Theoretical Probability** **17** (2004) 819–859.
- [29] A. Karlsson and M. Neuhauser: *The Bass conjecture and growth in groups*, **Colloquium Mathematicum** **100** (2004) 23–27.
- [30] D. I. Cartwright and W. Woess: *Isotropic random walks in a building of type  $\tilde{A}_d$* , **Mathematische Zeitschrift** **247** (2004) 101–135.
- [31] B. Krön and E. Teufl: *Asymptotics of the transition probabilities of the simple random walk on self-similar graphs*, **Transactions of the American Mathematical Society** **356** (2004) 393–414.
- [32] F. Lehner: *Cumulants in noncommutative probability theory II. Generalized Gaussian random variables*, **Probability Theory and Related Fields** **127** (2003) 407–422.
- [33] F. Lehner: *Cumulants in noncommutative probability theory I. Noncommutative exchangeability systems*, **Mathematische Zeitschr.** **248** (2004) 67–100.
- [34] F. Lehner: *Cumulants, lattice paths, and orthogonal polynomials*, **Discrete Mathematics** **270** (2003) 177–191.
- [35] S. Brofferio: *Speed of stochastic locally contractive systems*, **Annals of Probability** **31** (2003), 2040–2067.
- [36] S. Brofferio: *How a centred random walk on the affine group goes to infinity*, **Annales de l'Institut H. Poincaré (Probab. & Stat.)** **39** (2003) 371–384.
- [37] W. Woess: *Generating function techniques for random walks on graphs*, in “Heat Kernels and Analysis on Manifolds, Graphs, and Metric Spaces”, P. Auscher, Th. Coulhon and A. Grigor'yan, eds. **Contemporary Mathematics** **338** (2003) 391–423.
- [38] T. Ceccherini-Silberstein and W. Woess: *Growth-sensitivity of context-free languages*, **Theoretical Computer Science** **307** (2003), 103–116.
- [39] T. Ceccherini-Silberstein and W. Woess: *Growth and ergodicity of context-free languages*, **Transactions of the American Mathematical Society** **354** (2002) 4597–4625.
- [40] T. Nagnibeda and W. Woess: *Random walks on trees with finitely many cone types*, **Journal of Theoretical Probability** **15** (2002) 399–438.
- [41] V. A. Kaimanovich and W. Woess: *Boundary and entropy of space homogeneous Markov chains*, **Annals of Probability** **30** (2002) 323–363.
- [42] F. Lehner: *Free cumulants and enumeration of connected partitions*, **European Journal of Combinatorics** **23** (2002) 1025–1031.
- [43] P. Biane, F. Lehner: *Computation of some examples of Brown's spectral measure in free probability*, **Colloquium Mathematicum** **90** (2001) 181–211.
- [44] W. Woess: *Heat diffusion on homogeneous trees*, **Bollettino dell'Unione Matematica Italiana** **4-B** (2001) 703–709 and erratum (caused by printer), **Bollettino dell'Unione Matematica Italiana** **5-B** (2002) 259–260.

- [45] S. Brofferio and W. Woess: *On transience of card shuffling*, **Proceedings of the American Mathematical Society** **129** (2001) 1513–1519.
- [46] N. Seifter and W. Woess: *Approximating graphs with polynomial growth*, **Glasgow Mathematical Journal** **42** (2000) 1–8.

#### 14. MONOGRAPH

W. Woess: *Random Walks on Infinite Graphs and Groups*, Cambridge Tracts in Mathematics **138**, Cambridge University Press, 334+xi pages, 2000.

So far, approximately 1000 copies have been sold. Book review (among others) in:  
*Bulletin Amer. Math. Soc.* **39** (2002), 281–286 (Reviewer: T. Sunada).