

# Geometrisen analyysin seminaari, 2012-2013

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Seminaari kokoontuu perinteiseen aikaan **perjantaisin kello 14-16 salissa C124**.  
Aiheet vaihtelevat puhujista riippuen.

### Syksyn 2012 esitelmiä

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Maanantai, 27.8.2012 klo 14-16 C124 (huom. poikkeuksellinen aika!)

**Maria Carmen Reguera** (Lund)

"On a conjecture of Sarason on the composition of Toeplitz operators"

ABSTRACT: We consider the Bergman space  $L^2_a(D)$ , the space of analytic functions in the disk that are  $L^2$  bounded. A conjecture of Sarason discusses a characterization of the composition of two Toeplitz operators in the Hardy and Bergman spaces. The case of the Hardy space it is now well understood, and the conjecture was proven to be false by F. Nazarov. The Bergman space case, however, is still an open question and is the one we will discuss in this seminar. As in the case of the Hardy space, there is a connection between the composition of Toeplitz operators and a two weight inequality for the Bergman projection. We will further explain this connection and show necessary and sufficient conditions for the composition of Toeplitz operators to be bounded.

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Perjantai, 7.9.2012 klo 14-16 C124

**Alberto Setti**

"Stochastic properties of Riemannian manifolds and application to PDEs"

ABSTRACT: The asymptotic behavior of the heat kernel of a Riemannian manifold gives rise to the classical concepts of parabolicity, stochastic completeness (or conservative property) and Feller property (or  $C^0$ -diffusion property).

Both parabolicity and stochastic completeness have been the subject of a systematic study, which led to discovering sharp geometric conditions for their validity and to a rich array of tools, techniques and equivalent concepts ranging from maximum principles at infinity, function theoretic tests (Khas'minskii criterion), comparison techniques etc.... We aim at describing a number of steps forward in the development of a similar apparatus for the Feller property, and to present a number of applications of the Feller property to the asymptotic behavior of PDE's on the manifold.

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Perjantai, 14.9.2012 klo 14-16 C124

Ei seminaaria.

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Perjantai, 21.9.2012 klo 14-16 C124

Ei seminaaria

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Perjantai, 28.9.2012 klo 14-16 C124

**Tuomo Kuusi**

"Linear potentials in nonlinear potential theory"

ABSTRACT: We give an update to some aspects of theory for solutions to nonlinear elliptic or parabolic, possibly degenerate, equations involving  $p$ -Laplacian type operators and datum, which, in full generality, can be a measure. The main focus is to describe recent pointwise potential estimates for gradients of solutions.

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Perjantai, 5.10.2012 klo 14-16 C124

**Mikko Parviainen** (Jyväskylä)

"Tug-of-war with selling option, discontinuous gradient constraints, and the infinity Laplacian"

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Perjantai, 12.10.2012 klo 14-16 C124

**Jasun Gong**

"The Lip-lip condition on doubling metric measure spaces"

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Perjantai, 19.10.2012 klo 14-16 C124

**Zoltan Buczolich**

"Multifractal Hölder spectra of generic functions and measures"

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Perjantai, 26.10.2012 klo 14-15 C124

**Kenneth Falconer**

ABSTRACT: I will discuss the construction of certain families of self-similar fractals which display various symmetries. I will then indicate how methods from group theory may be used to analyse the symmetries and enumerate the fractals in such families with each symmetry group.

The talk should be appropriate to a reasonably broad audience.

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Perjantai, 2.11.2012 klo 14-16 C124

Ei seminaaria.

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Perjantai, 9.11.2012 klo 14-16 C124

Ei seminaaria.

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Perjantai, 16.11.2012 klo 14-16 C124

**Alexei Poltoratski**

"5. Lecture of the crash course (title TBA)"

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Perjantai, 23.11.2012 klo 14-16 C124

**Juhana Siljander**

"Harnack type estimates for time-fractional heat equation"

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Perjantai, 30.11.2012 klo 14-16 C124

**Jan Cristina**

"Energy minimising quasiconformal frames"

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Perjantai, 7.12.2012 klo 14-16 C124

Ei seminaaria.

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Perjantai, 14.12.2012 klo 14-16 C124

**Pekka Pankka**

"Little is big after rescaling for quasiregular essential singularities"

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## Kevään 2013 esitelmää

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Perjantai, 11.1.2013 klo 14-16 C124

**Naotaka Kajino**

"Analysis and geometry of the measurable Riemannian structure on the Sierpinski gasket (and other fractals)"

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Perjantai, 18.1.2013 klo 14-16 C124

**Lizaveta Ihnatsyeva**

"Tangential behaviour of Poisson integrals of regular functions"

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Perjantai, 25.1.2013 klo 14-16 C124

**Esa Järvenpää**

"Dimensions of random affine code tree fractals"

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Perjantai, 1.2.2013 klo 14-16 C124

**Dmitry Chelkak**

"Extremal length and other conformal invariants in discrete complex analysis"

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Perjantai, 8.2.2013 klo 14-16 C124

TBA

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**Torstai**, 14.2.2013 klo 12-14 C124 Funktionaalianalyysin, Geometrisen analyysin, ja Analyysin ja geometrian (Aalto) yhteisseminaari

**Luca Capogna**

"Regularity for subelliptic PDE through uniform estimates in multi-scale geometries"

ABSTRACT:

This talk will focus on some recent results concerning existence and regularity of certain subelliptic evolution equations through a "multi-scale" Riemannian approximation scheme, in which the "forbidden" directions are penalized by a parameter  $\epsilon$ . The main technical novelties are Gaussian estimates, doubling and Poincaré inequalities which are stable as the parameter  $\epsilon \rightarrow 0$  and the Riemannian ambient geometry collapses to the sub-Riemannian structure. These results are part of an ongoing program joint with Citti, Manfredini, Rea and Senni Guidotti Magnani.

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Perjantai, 15.2.2013 klo 14-16 C124

Ei seminaaria

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Perjantai, 22.2.2013 klo 14-16 C124

**Raul Serapioni**

"Intrinsic Lipschitz graphs in Carnot groups"

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Perjantai, 1.3.2013 klo 14-16 C124

**Gregory Arone**

"Polynomial approximations in topology"

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Perjantai, 8.3.2013

**Anton Lukyanenko**

"Heisenberg Continued Fractions"

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Perjantai, 15.3.2013 klo 14-16 C124

**Juhani Koivisto**

"Generalizing Kazhdan's property (T) and cohomological vanishing for uniformly bounded representations"

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Perjantai, 22.3.2013 klo 14-16 C124

**Tomasz Adamowicz**

"Curvature problems for  $\rho$ -harmonic mappings in the plane"

ABSTRACT:

In this talk we will discuss  $\rho$ -harmonic mappings in planar domains. These are nonlinear counterparts of harmonic mappings arising naturally in nonlinear elasticity theory and differential geometry.

First we will set up the stage and discuss basic properties of  $\rho$ -harmonic functions and mappings and their relations to quasiregular mappings. Then, we will investigate the curvature of level curves for component functions of a  $\rho$ -harmonic mapping, estimate their lengths and present variant of an isoperimetric inequality for level curves. If time permits we will discuss some open problems.

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Perjantai, 29.3.2013 klo 14-16 C124

Ei seminaaria (Pitkäperjantai)

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Perjantai, 5.4.2013 klo 14-16 C124

**Pekka Pankka**

"Rickman's Picard construction in all dimensions II: partitions"

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Perjantai, 12.4.2013 klo 14-16 C124

Ei seminaaria

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Perjantai, 19.4.2013 klo 14-16 C124

Ei seminaaria

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Perjantai, 26.4.2013 klo 14-16 C124

**Pekka Pankka**

"Rickman's Picard construction in all dimensions III"

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Perjantai, 3.5.2013 klo 14-16 C124

**Pekka Pankka**

"Rickman's Picard construction in all dimensions IV: pillows"

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Perjantai, 10.5.2013 klo 14-16 C124

**Jan Cristina**

"Holonomy bounds for non-smooth connections"

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## Syksyn 2013 esitelmiä

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Tiistai, 27.8.2013 klo 14-16 C124 (huom. poikkeuksellinen aika!)

**Nils Dencker** (Lund)

"The solvability and range of differential operators"

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Perjantai, 1.11.2013 klo 14-16 C124

**Riikka Korte**

"TBA"

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Perjantai, 8.11.2013 klo 14-16 C124

**Tuomo Kuusi**

"TBA (part II)"

**Tervetuloa!**

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