MICHAEL RUZHANSKY

Senior Full Professor, Ghent University, Belgium
Professor of Mathematics, Queen Mary University of London, UK
Honorary Professor, Imperial College London, UK
Ongoing projects

FWO ODYSSEUS 1
Analysis and Partial Differential Equations €2,710,616

EP/R003025/1: Regularity in affiliated von Neumann algebras and applications to partial differential equations £498,675

EU H2020 Marie Curie: Lower bounds for partial differential operators on compact Lie groups with Serena Federico

BOF: Symbolic calculus of eigenfunction expansions €200,000

Medical Imaging & Analysis
9 people 8 different nations
LJUBICA OPARNICA
POSTDOC RESEARCHER AT GHENT UNIVERSITY
FULL PROFESSOR AT THE UNIVERSITY OF NOVI SAD
Research topic and Contribution to the Group:
Fractional calculus
PDEs with singularities


NIYAZ TOKMAGAMBEKOV

POSTDOC RESEARCHER
GHENT UNIVERSITY
Research topic and Contribution to the Group:

Direct and Inverse Problems for PDEs
Nonharmonic analysis
Very weak solutions


SERENA FEDERICO
Marie Curie Fellow
Smoothing and Strichartz estimates for Schrödinger-type operators
Lower bounds for PDO’s on compact Lie groups


DAVID ROTTENSTEINER
POSTDOCTORAL RESEARCHER AT GHENT UNIVERSITY
Practical formula on $L^2(\mathbb{R}^n)$.

$$\int_{\mathbb{R}^n} |f(x)|^2 \, dx = \sum_{n \in \mathbb{Z}^n} \left| \hat{f}(n) \right|^2$$

**Proof:** If $f \in L^2(\mathbb{R}^n)$, the so-called Schrödinger representations take place, namely, $\hbar = h = Planck's\, constant$.

**Example:** $G = B^n \setminus \{0\}$, $f(x) = f(-y + x) = f(x - y)$.

- **Compactness:** $H_0$ is finite dimensional.
- $H_0 = B^n \setminus \{0\}$, $(x, y, z) \mapsto (x', y', z') = (y - x, z - x)$.
Research topic and Contribution to the Group:

Noncommutative analysis
Time frequency analysis


BERIKBOL TOREBEK

Postdoctoral researcher at Ghent University

Leading researcher of the Institute of Mathematics and Mathematical Modeling, Kazakhstan
Research topic and Contribution to the Group:
Fractional calculus
Inverse problems


Berikbol Torebek
Research topic and Contribution to the Group:

Noncommutative analysis
Functional inequalities
Linear and non-linear PDEs


Retinex Theory

Computational Vision System

Let $I(x)$ be an image on $D$, the intensity of $I(x)$ depends on two main factors:

- The amount of complex illumination belonging to an object.
- The amount of light reflected by an object.

Fig. 2: Schematic diagram of the computational vision system.
Junqing Huang

Research topic and Contribution to the Group:

Image processing
Theoretical Analysis of Deep Learning


Professor Sundaram Thangavelu
(Indian Institute of Science, Bangalore)
Heisenberg group
DUVÁN CARDONA SÁNCHEZ

PHD STUDENT AT GHENT UNIVERSITY
Research topic and Contribution to the Group: Pseudo-differential Operators
Harmonic Analysis on Lie groups
Differential Geometry, PDE


• Cardona D., Delgado J., Ruzhansky M. \textit{Lp-bounds for pseudo-differential operators on graded Lie groups}, \textit{arXiv:1911.03397}

• Cardona D., Ruzhansky M. \textit{Boundedness of pseudo-differential operators in subelliptic Sobolev and Besov spaces on compact Lie groups}, \textit{arXiv:1901.06825}

• Cardona D., Ruzhansky M. \textit{Hörmander condition for pseudo-multipliers associated to the harmonic oscillator}, \textit{arXiv:1810.01260}

• Cardona D., Ruzhansky M. \textit{Littlewood-Paley theorem, Nikolskii inequality, Besov spaces, Fourier and spectral multipliers on graded Lie groups}, \textit{arXiv}
VISHVESH KUMAR
POSTDOCTORAL RESEARCHER AT UGENT
Research topic and Contribution to the Group:

Harmonic analysis
Pseudo-differential operators


• M. Chatzakou and V. Kumar, $L^p$-$L^q$ boundedness of Fourier multipliers associated with the anharmonic Oscillator, (2020) Arxiv.

Research topic and Contribution to the Group:

Spectral symbolic analysis
Harmonic analysis on locally profinite groups

Velasquez-Rodriguez J.P.

Hörmander classes of pseudo-differential operators over the compact group of $p$-adic integers.


Velasquez-Rodriguez J.P.

On some spectral properties of pseudo-differential operators on $T$.

Friday no-time-limit GAP group seminar
ARSHYN ALTYBAY

PHD STUDENT
GHENT UNIVERSITY
AND
AL-FARABI KAZAKH NATIONAL UNIVERSITY
Research topic and Contribution to the Group:

**Numerical analysis: high-performance computing**
**Numerical simulation of PDE**


AIDYN KASSYMOV

PhD Student
Ghent University
and
Institute of Mathematics and Mathematical Modeling,
Almaty, Kazakhstan
Research topic and Contribution to the Group:
Functional inequalities on groups
Spectral geometry


Professor Haihui Wang
Beijing Aeronautics University
Wavelets, Data analysis
Partial Hypoellipticity of Partial Differential Operators
BAYAN BEKBOLAT

PHD STUDENT
Ghent University and
Al-Farabi Kazakh National University, Almaty Kazakhstan

Research topic and Contribution to the Group:
Harmonic analysis associated with the Dunkl operator

Bekbolat B., Kassymov A., Tokmagambetov N.

Blow-up of Solution of Nonlinear Heat Equation with Hypoelliptic Operators on Graded Lie Groups.

Lecturer: **Professor Igor Trooshin** (Shinshu University, Japan)
Doctoral school on inverse spectral and scattering problems
2-11 March 2020
Research topic and Contribution to the Group:

Noncommutative harmonic analysis
Pseudo-differential operators


BOLYS SABITBEK

GHENT ANALYSIS AND PDE CENTER
POSTDOCTORAL RESEARCHER
AT QUEEN MARY UNIVERSITY OF LONDON
Research topic and Contribution to the Group:

Functional inequalities and applications
Noncommutative analysis


Seminars with cake break
AISHABIBI DUKENBAYEVA

PHD STUDENT

GHENT UNIVERSITY

AND

AL-FARABI KAZAKH NATIONAL UNIVERSITY

PDEs
(Non–local) Boundary Value Problems,
Inverse (Spectral) Problems

Sadybekov M., Dukenbayeva A.,
Direct and inverse problems for the Poisson equation with equality of flows on a part of the boundary.
Complex Variables and Elliptic Equations, 64 (2019), no. 5, 777-791.
Visitor
Professor Sanja Konjik
Novi Sad, Serbia
Fractional Calculus
Inverse source and initial problems for evolution equations for positive operators

Ruzhansky M., Serikbaev D., Tokmagambetov N., Torebek B., 
Monday morning seminar
Professor Jean-Philippe Anker (Université d'Orléans, France)
Mini-course on symmetric spaces
Research topic and Contribution to the Group:

Harmonic Analysis and Analysis on Manifolds


Relax time at PhD office
ERKINJON KARIMOV

Ghent Analysis and PDE Center

SENIOR RESEARCHER OF THE INSTITUTE OF MATHEMATICS
UZBEKISTAN ACADEMY OF SCIENCES
Research topic and Contribution to the Group:

Direct and Inverse Problems for PDEs with different fractional integro-differential operators

- Karimov E., Mamchuev M., Ruzhansky M. **Nonlocal initial problem for second order time-fractional and space-singular equation.** Accepted to *Hokkaido Mathematical Journal*

CLAUDIA GARETTO

Ghent Analysis and PDE Center

SENIOR LECTURER
LOUGHBOROUGH UNIVERSITY
Research topic and Contribution to the Group:

**Hyperbolic equations**

**Hyperbolic systems with singularities and multiplicities**


Coffee and tea breaks
JULIO DELGADO

Ghent Analysis and PDE Center

POSTDOCTORAL RESEARCH ASSISTANT
Queen Mary University of London, UK

ASSOCIATE PROFESSOR
UNIVERSITY DEL VALLE, COLOMBIA
Research topic and Contribution to the Group:

Pseudo-differential Operators
Harmonic Analysis on Lie groups
Spectral Theory


DURVUDKHAN SURAGAN

Ghent Analysis and PDE Center

ASSOCIATE PROFESSOR
NAZARBAYEV UNIVERSITY, NUR-SULTAN, KAZAKHSTAN
Research topic and Contribution to the Group:
Functional inequalities and related analysis

Lp-Caffarelli-Kohn-Nirenberg type inequalities on homogeneous groups, Quarterly Journal of Mathematics, 70 (2019), 305-318. (with Ozawa T. and Ruzhansky M.)


Layer potentials, Green formulae, Kac problem, and refined Hardy inequality on homogeneous Carnot groups, Advances in Mathematics, 308 (2017), 483-528. (with Ruzhansky M.)


TOKIO MATSUYAMA

Ghent Analysis and PDE Center

Professor at Chuo University, Japan
Research topic and Contribution to the Group
Functional Analysis
PDE


JENS WIRTH

Ghent Analysis and PDE Center

Professor at University of Stuttgart, Germany
Research topic and Contribution to the Group

Pseudo-Differential Operators
Compact Lie groups
PDEs


VILLE TURUNEN

Ghent Analysis and PDE Center

Senior University Lecturer
Aalto University, Finland
Research topic and Contribution to the Group

Time-Frequency Analysis
Pseudo-Differential Operators


Home made Belgian waffles and Belgian chocolates
Professor Anvar Hasanov
Institute of Mathematics, Uzbekistan
Special functions
ANVAR HASANOV

Ghent Analysis and PDE Center

LEADING RESEARCHER AT INSTITUTE OF MATHEMATICS, UZBEK ACADEMY OF SCIENCES, TASHKENT, UZBEKISTAN
Research topic and Contribution to the Group:

Degenerate PDE
Special functions


BALTABEK KANGUZHZIN

Ghent Analysis and PDE Center

Professor
Al–Farabi Kazakh National University
Almaty, Kazakhstan

Associated researcher
Research topic and Contribution to the Group

Spectral Theory
PDEs


Hardy inequalities

Marián Slodička

Ghent Analysis and PDE Center

Full Professor
Ghent University
Research topic and Contribution to the Group:

Applied PDEs
Inverse problems


APARAJITA DASGUPTA
Ghent Analysis and PDE Center

Assistant Professor at the Department of Mathematics
Indian Institute of Technology Delhi
Research topic and Contribution to the Group:

Harmonic analysis
Pseudo-differential operators


10 people 10 nations

India
Russia
Germany
Austria
Kazakhstan
Colombia
Ethiopia
China
Italy
Serbia
MOHAMMED ELAMINE SEBIH

Ghent Analysis and PDE Center

PHD STUDENT
UNIVERSITY DJILALI LIABES OF SIDI BEL ABBES, ALGERIA

ASSISTANT AT THE UNIVERSITY MUSTAPHA STAMBOLI
OF MASCARA, ALGERIA
Research topic and Contribution to the Group:

Partial differential equations with irregular coefficients

LINDA BOTCHWAY

Ghent Analysis and PDE Center
PhD student at University of Ghana

Pseudo-differential calculus on the lattice and applications

Botchway L., Kibiti G., Ruzhansky M.
Difference equations and pseudo-differential operators on Zn
CARLOS ANDRES RODRIGUEZ

Ghent Analysis and PDE Center

PhD Student
University of Los Andes
Colombia

Quantum groups
Wave equations
WAGNER AUGUSTO ALMEIDA DE MORAES

Ghent Analysis and PDE Center

PhD Student
University of Paraná, Curitiba
Brazil
Research topic and Contribution to the Group:

**Hypoellipticity and solvability**


- Kirilov A., De Moraes W., Ruzhansky M., **Global properties of vector fields on compact Lie groups in Komatsu classes. II. Normal forms**. arXiv

- Kirilov A., De Moraes W., Ruzhansky M., **Global properties of vector fields on compact Lie groups in Komatsu classes**. arXiv

- Kirilov A., De Moraes W., Ruzhansky M., **Global hypoellipticity and global solvability for vector fields on compact Lie groups**. arXiv
Department lunch
JASSON VINDAS

Ghent Analysis and PDE Center

Associate Professor
Ghent University
Research topic and Contribution to the Group:

Functional Analysis
Harmonic Analysis
Analytic Number Theory


• R.Estrada, J.Vindas, Y.Yang, The Fourier transform of thick distributions, Anal. Appl. (Singap.), accepted.

ANDREAS DEBROUWERE

FWO Postdoctoral Fellow
Ghent University
Research topic and Contribution to the Group:

Functional Analysis

- A. Debrouwere, **Solution to the Stieltjes moment problem in Gelfand-Shilov spaces**, *Studia Math.*, accepted.

- A. Debrouwere, **Quasinormable C0-groups and translation-invariant Frechet spaces of type D_E**, *Results Math.*, accepted.


LENNY NEYT

PHD STUDENT
GHENT UNIVERSITY


Frederik Broucke

PHD STUDENT
GHENT UNIVERSITY

F. Broucke, G. Debruyne, J. Vindas,
Gregory Debruyne

Ghent Analysis and PDE Center
FWO Research Fellow
Ghent University
Post-doctoral Francqui Foundation Fellow
University of Illinois at Urbana-Champaign
Research topic and Contribution to the Group:

**Approximation theory/ Tauberian theory**

**Analytic number theory and combinatorics**


GHENT
HANS VERNAEVE

Ghent Analysis and PDE Center

Associate Professor
Ghent University
Research topic and Contribution to the Group:

Generalized functions
Nonstandard analysis


ANDREAS WEIERMANN

Ghent Analysis and PDE Center
Senior Full Professor
Ghent University
Research topic and Contribution to the Group:

Analytic logic
Proof theory


We are an intercontinental mathematical research centre with highly diverse backgrounds.

Wide range of research topics:
- Partial differential equations (PDE)
- Nonlinear functional analysis
- Nonlinear elliptic operators
- Spectral theory
- Geometric analysis
- Harmonic analysis
- Numerical analysis
- Wavelets
- Data science
- Machine learning
- Applications to applied sciences

Interdisciplinary research is welcome.
We seek out collaborations across fields: engineering, physics, medicine, biology, etc.
We promote expertise and modeling for PDE-related questions in applied sciences.

Research grants of our members:
- NWO/DS2 FWO Officers / Project Analysis and Partial Differential Equations
- FWO and BBOI Grant
- EU HEROS Marie Curie Incoming Fellowship
- EPSRC/Chains
- EMBO/Early Career Fellowship
- LEVERHULME Grants
- Foundations Grants
- Royal Society Grants

Prizes and Awards of our members:
- Royal Society Esmée Fairbairn Prize
- 2 European Young Researcher Prizes
- 3 NWO/DS2 Prizes
- Scopus 'Top 1% in National Science' Award
- Junior University Fellow MRF Scientist Award
- 2 Dorothy Hodgkin Prizes for PDE projects
- 2多次赢取Hellman Junior Scientist Award
- Award for student and young researchers

PhD positions and MSc/BS projects available.
Students are welcome to consider this exciting opportunity to work on an exciting and innovative research project.

https://www.analyse-ghent.org/

Head of group: Prof. Dr. Michael Bachmayr
UCL, WDG, Goethe Str. 6, 386 1/2
Be harmonic with analysis