Sergiu MOROIANU

Contact

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Research interests

Index theory on singular manifolds, spectral functions, algebras of pseudodifferential operators.

Education

2005 Qualification à la fonction de Professeur des universités (France).

2004 Habilitation à diriger des recherches, Université Paul Sabatier, Toulouse, France;

1999 PhD in Mathematics, dissertation: *Residue functionals on the algebra of adiabatic pseudo-differential operators*, MIT, USA;

1996 Licenţiat în matematică, Universitatea Bucureşti, România;

1994 DEA de Mathématiques, École Polytechnique, Palaiseau, France;

1991 Bacalaureat, Liceul de Informatică, Bucureşti, România.

Work experience

- Since July 2005: Associate professor, IMAR, Bucharest, Romania;
- Sep. 2004 – July 2005: Assistant professor, IMAR;
- Oct. 2002 – Sep. 2004: Post-doc, Université Paul Sabatier, Toulouse, France;
- Oct. 2001 – Sep. 2002: Post-doc, EU-Drittmittel-Stelle im Rahmen des Research and Training Network "Geometric Analysis", Universität Hamburg, Germany;
- Aug. 1999 – Sep. 2001: Researcher, IMAR;
- Sep. 1994 – Jul. 1999: Teaching Assistant, MIT, USA.

Publications

(1) *Hochschild Homology of algebras of pseudodifferential operators*, 4th International Workshop on Differential Geometry and its Applications, Transilvania University Press, Braşov (2000), 189–197.

(2) *Fredholm Theory for degenerate pseudodifferential operators on manifolds with fibered boundaries*, (with Robert Lauter), Comm. Partial Diff. Equat. **26** (2001), 233–285.

(3) *Adiabatic limits of eta and zeta functions: a pseudo-differential approach*, Anal. Univ. Timisoara, ser. Mat. – Info., vol. XXXIX (2001), fasc. spec. Mat., 303–312.

(4) *Homology of pseudo-differential operators on manifolds with fibered boundaries*, (with Robert Lauter), J. Reine Angew. Math. **547** (2002), 207–234.

(5) *The index of cusp operators on manifolds with corners*, (with Robert Lauter), Ann. Global Anal. Geom. **21** (2002), 31–49.

(6) *Sur la limite adiabatique des fonctions êta et zêta*, Comptes Rendus Math. **334** (2002), 131–134.

(7) *K-Theory of suspended pseudo-differential operators*, K-Theory **28** (2003), 167–181.

(8) *Adiabatic limits of eta and zeta functions of elliptic operators*, Math. Z. **246** (2004), 441–471.

(9) *Homology of pseudodifferential operators on manifolds with fibered cusps*, (with Robert Lauter), T. Am. Mat. Soc. **355** (2003), 3009–3046.

(10) *Heat Kernel Asymptotics for Roots of Generalized Laplacians,* (with Christian Bär), Int. J. Math. **14** (2003), 397–412.
(11) *Homology of adiabatic pseudo-differential operators,* Nagoya Math. J. **175** (2004), 171–221.
(12) *An index formula on manifolds with fibered cusp ends,* (with Robert Lauter), J. Geom. Analysis **15** (2005), 261–283.
(13) *Cusp geometry and the cobordism invariance of the index,* Adv. Math. **194** (2005), 504-519.
(14) *Weyl laws on open manifolds,* to appear in Math. Annalen.
(15) *On the L^p index of spin Dirac operators on conical manifolds,* (with André Legrand), Studia Math. **177** (2006), 97–112.
(16) *On Carvalho's K-theoretic formulation of the cobordism invariance of the index,* P. Am. Math. Soc. **134** (2006), 3395-3404.
(17) *Gravitational and axial anomalies for generalized Euclidean Taub-NUT metrics* (with Ion Cotăescu and Mihai Vişinescu), J. Phys. A – Math. Gen. **38** (2005), 7005-7019.
(18) *On the structure of quantum permutation groups* (with Teodor Banica), P. Am. Mat. Soc. **135** (2007), 21–29.
(19) *L^2-index of the Dirac operator of generalized Euclidean Taub-NUT metrics* (with Mihai Vişinescu), J. Phys. A - Math. Gen. **39** (2006), 6575–6581.
(20) *Fibered cusp versus d-index theory,* Rendiconti Semin. Math. Padova. **117** (2007), 193–203.
(21) *Quasi-fuchsian manifolds with particles* (with Jean-Marc Schlenker), submitted.
(22) *Index and homology of pseudodifferential operators on manifolds with boundary* (with Victor Nistor), to appear in Proc. OAMP3 (Bucharest 2005).
(23) *Spectral analysis of magnetic Laplacians on conformally cusp manifolds* (with Sylvain Golénia), to appear in Ann. H. Poincaré.
(24) *The Dirac spectrum on manifolds with gradient conformal vector fields,* (with Andrei Moroianu), to appear in J. Funct. Analysis.
(25) *Adiabatic limit of the Eta invariant over cofinite quotient of $PSL(2,R)$* (with Paul Loya and Jinsung Park), submitted.
(26) *The spectrum of k-form Schrödinger Laplacians on conformally cusp manifolds* (with Sylvain Golénia), submitted.

Courses and talks

- *Courses*:
  - Mini-course "Spectral asymptotics for Dirac operators", Korea Institute of Advanced Studies summer school, 2007.
  - "Hyperbolic manifolds in dimensions 2 and 3", Şcoala Normală Superioară Bucharest, 2007 (with Jean-Marc Schlenker);
  - "K-theory and differential operators", Şcoala Normală Superioară, 2005;
  - "Algebraic Topology", University of Bucharest, 2005;
  - Mini-course "Introduction to Global Analysis", Instituto Superior Tecnico, Lisbon, Feb. 2002;
  - "Differential geometry", University of Piteşti, 2001;
  - "Mathematical methods for engineers", MIT, 1999;
  - "Differential equations", MIT, 1998;
  - "Linear Algebra", MIT, 1997.
- *Conference talks*:
  - *Workshop on Analysis and Geometry*, Hannover, Sep. 2007.

- *Spectral problems for Dirac and Laplace operators*, Paris, Jan. 2007.
- *Spectral theory and Global Analysis*, Oldenburg, Aug. 2006.
- *PDE's on noncompact and singular manifolds*, Potsdam, Aug. 2006.
- *KIAS Workshop on Spectral Invariants and Related Topics*, Seul, May 2006.
- *7*th *Intl. Workshop on Differential Geometry and its Applications*, Deva, Sept. 2005;
- *Analysis and Geometric Singularities*, Oberwolfach, Aug. 2005;
- *Second joint meeting of AMS, DMV, ÖMV*, Mainz, Iun. 2005;
- *Degenerate PDE's and Singular Geometries*, Potsdam, Aug. 2004;
- *Analyse Géométrique*, CIRM Marseille, March 2004;
- *Operator Algebras, Singularities, Deformation Quantisation*, Potsdam, March 2004;
- *Operator algebras on manifolds with singularities*, Potsdam, March 2003;
- *Journées Nancéiennes de Géométrie*, Nancy, Jan. 2003;
- *Geometric analysis and singular spaces*, Oberwolfach, June 2002;
- *5*th *Intl. Workshop on Differential Geometry and its Applications*, Timişoara, Sept. 2001;
- *Ellipticity and Parabolicity in Analysis and Geometry*, Potsdam, Aug. 2001;
- *Geometric Analysis*, Potsdam, Oct. 2000;
- *L^2-Methods in Geometry*, Sarasota, Jan. 2000;
- *4*th *Intl. Workshop on Differential Geometry and its Applications*, Braşov, Sept. 1999;
- *Operator Algebras and Asymptotics on Manifolds with Singularities*, Warsaw, April 1999.
- *Seminar invited talks*
  - 2007: IMAR; Chişinău.
  - 2006: Toulouse.
  - 2005: Potsdam.
  - 2004: IMAR.
  - 2003: Ecole Polytechnique; HU Berlin; Ecole Normale Lyon; Clermont-Ferrand.
  - 2002: IST Lisbon; Paris 6.
  - 2001: Paris 11; Mainz.

Honors and awards
- Romanian Academy prize "Simion Stoilow", 2003 (awarded in 2005).
- National Foundation for Science and Arts prize, 2004.
- International Mathematical Olympiads
  - 1991: first prize (42 pts.);
  - 1990: second prize.

Languages
- Romanian: native;
- English, French: fluent;
- German: advanced;
- Italian, Portuguese, Spanish: beginner.