

## CS 1 dr habil Sergiu MOROIANU

**Adresa:** IMAR, PO.Box 1-764, RO-014700, București

**Fax:** +40-21-3196505

**E-mail:** moroianu@alum.mit.edu

**Internet:** www.imar.ro/~sergium

**Data și locul nașterii:** 1973, București.

**Domenii de cercetare:** Teoria indexului, calculul pseudodiferențial pe spații singulare, varietăți hiperbolice, funcții zeta spectrale și geometrice, varietăți Einstein.

### Experiența profesională

- Sep. 2013–prezent: Cercetător Științific grad 1, IMAR, București.
- Sep. 2021: Visiting Professor, Université de Lorraine, Metz.
- Apr.–Iun. 2012: Visiting Professor, Ecole Polytechnique, Palaiseau, Franța.
- Dec. 2011: Visiting Professor, Ecole Polytechnique, Palaiseau.
- Apr.–iun. 2011: CNRS Visiting Professor, Ecole Polytechnique, Palaiseau.
- Sep.–Nov. 2010: CNRS Visiting Professor, Ecole Normale Supérieure, Paris, Franța.
- Aprilie 2006 – Oct. 2008: Director, Departamentul de Matematică, Școala Normală Superioară București.
- Iun. 2005–sep. 2013: Cercetător Științific grad II, IMAR, București.
- 2005: (februarie–iunie) Profesor asociat la Școala Normală Superioară București și la Universitatea București.
- 2004–2005: Cercetător principal grad III, IMAR, București.
- 2002–2004: Cercetător la Universitatea Paul Sabatier, Toulouse, Franța.
- 2001-2002: Cercetător la Universitatea Hamburg, Germania.
- 2001: Profesor asociat la Universitatea Pitești și la Universitatea București.
- 1999–2001: Cercetător, IMAR, București.
- 1994–1999: Asistent în departamentul de matematică al MIT, Cambridge, MA, SUA.
- 1997–1999: Instructor în semestrul de vară, MIT.
- 1996–1999: Asistent de cercetare stagiar, IMAR.

### Studii și diplome

- 2013 Abilitare, IMAR.
- 2010 Calificarea la funcția de profesor universitar, Franța.
- 2004 Abilitarea de a conduce cercetări, Universitatea Paul Sabatier, Toulouse, Franța. Director: André Legrand.
- 1999 Teza de doctorat “*Residue functionals on the algebra of adiabatic pseudo-differential operators*”, MIT, SUA. Profesor: R.B. Melrose.
- 1991-1996 Universitatea București, Facultatea de Matematică. Lucrarea de licență “*Teorema de index Atiyah-Singer*”. Profesor : K. Teleman.
- 1993-1994 Ecole Polytechnique, Franța. Diploma de studii aprofundate (DEA) “*Le théorème de l’indice de Atiyah-Singer*”. Profesor: P. Gauduchon.
- 1991 Bacalaureat, Liceul de Informatică București.

### Lista de lucrări

- (1) *Fredholm Theory for degenerate pseudodifferential operators on manifolds with fibered boundaries* (cu Robert Lauter), *Comm. Partial Diff. Equat.* **26** (2001), 233–285.
- (2) *Homology of pseudo-differential operators on manifolds with fibered boundaries* (cu Robert Lauter), *J. Reine Angew. Math.* **547** (2002), 207–234.
- (3) *The index of cusp operators on manifolds with corners* (cu Robert Lauter), *Ann. Global Anal. Geom.* **21** no. 1 (2002), 31–49.
- (4) *Sur la limite adiabatique des fonctions  $\eta$  et  $\zeta$* , *Comptes Rendus Math.* **334** (2002), 131–134.
- (5) *K-Theory of suspended pseudo-differential operators*, *K-Theory* **28** (2003), 167–181.
- (6) *Adiabatic limits of eta and zeta functions of elliptic operators*, *Math. Zeitschrift* **246** (2004), 441–471.
- (7) *Homology of pseudodifferential operators on manifolds with fibered cusps*, (cu Robert Lauter), *Trans. Amer. Mat. Soc.* **355** (2003), 3009–3046.
- (8) *Heat Kernel Asymptotics for Roots of Generalized Laplacians* (cu Christian Bär), *Int. J. Math.* **14** (2003), 397–412.
- (9) *Homology of adiabatic pseudo-differential operators*, *Nagoya Math. J.* **175** (2004), 171–221.
- (10) *An index formula on manifolds with fibered cusp ends*, (cu Robert Lauter), *J. Geom. Analysis* **15** (2005), 261–283.
- (11) *Cusp geometry and the cobordism invariance of the index*, *Adv. Math.* **194** (2005), 504–519.
- (12) *On Carvalho’s K-theoretic formulation of the cobordism invariance of the index*, *Proc. Amer. Math. Soc.* **134** (2006), 3395–3404.
- (13) *Gravitational and axial anomalies for generalized Euclidean Taub-NUT metrics* (cu Ion Cotăescu și Mihai Vișinescu), *J. Phys. A - Math. Gen.* **38** (2005), 7005–7019.
- (14) *On the structure of quantum permutation groups* (cu Teodor Banica), *Proc. Am. Mat. Soc.* **135** (2007), 21–29.
- (15)  *$L^2$ -index of the Dirac operator of generalized Euclidean Taub-NUT metrics* (cu Mihai Vișinescu), *J. Phys. A - Math. Gen.* **39** (2006), 6575–6581.
- (16) *On the  $L^p$  index of spin Dirac operators on conical manifolds* (cu André Legrand), *Studia Mathematica* **177** (2006), 97–112.
- (17) *Fibered cusp versus  $d$ -index theory*, *Rendiconti Semin. Math. Padova* **117** (2007), 193–203.
- (18) *The Dirac spectrum on manifolds with gradient conformal vector fields* (cu Andrei Moroianu), *J. Funct. Analysis* **253** nr. 1 (2007), 207–219.
- (19) *Weyl laws on open manifolds*, *Math. Ann.* **340**, nr. 1 (2008), 1–21.
- (20) *Index and homology of pseudodifferential operators on manifolds with boundary* (cu Victor Nistor), *Perspect. Operat. Algebras Math. Phys.* (2008), 123–148.
- (21) *Spectral analysis of magnetic Laplacians on conformally cusp manifolds* (cu Sylvain Golénia), *Ann. H. Poincaré* **9** (2008), 131–179.
- (22) *Quasi-fuchsian manifolds with particles* (cu Jean-Marc Schlenker), *J. Differ. Geom.* **83** (2009), 75–129.
- (23) *The spectrum of  $k$ -form Schrödinger Laplacians on conformally cusp manifolds* (cu Sylvain Golénia), *Trans. Amer. Math. Soc.* **364** (2012), 1–29.
- (24) *Adiabatic limit of the Eta invariant over cofinite quotients of  $PSL(2, R)$*  (cu P. Loya și J. Park), *Compositio Mat.* **144** (2008), 1593–1616.

- (25) *Regularity of the eta function on manifolds with cusps* (cu Paul Loya și Jinsung Park), *Math. Zeitschrift* **269** (2011), no. 3–4, 955–975.
- (26) *Eta invariant and Selberg Zeta function of odd type over convex co-compact hyperbolic manifolds* (cu Colin Guillarmou and Jinsung Park), *Advances in Math.* **225** (2010), no. 5, 2464–2516.
- (27) *The Dirac operator on generalized Taub-NUT spaces* (cu Andrei Moroianu), *Commun. Math. Phys.* **305** (2011), 641–656.
- (28) *On the Singularities of the Zeta and Eta functions of an Elliptic Operator* (cu Paul Loya și Raphael Ponge), *Int. J. Math.* **23**, no. 6 (2012), 1250020.
- (29) *Bergman and Calderón projectors for Dirac operators* (cu Colin Guillarmou și Jinsung Park), *J. Geom. Analysis* **24**, no. 1 (2014), 298–336.
- (30) *Chern-Simons line bundle on Teichmüller space* (cu Colin Guillarmou), *Geometry & Topology* **18** (2014), 327–377.
- (31) *The Cauchy problem for Einstein metrics and parallel spinors* (cu Bernd Ammann și Andrei Moroianu), *Commun. Math. Phys.* **320**, 173–198 (2013).
- (32) *A Spinorial Approach to Riemannian and Conformal Geometry* (monografie în colaborare cu Jean-Pierre Bourguignon, Oussama Hijazi, Jean-Louis Milhorat și Andrei Moroianu, 458 pagini), *EMS Monographs in Mathematics*, 2015
- (33) *Ricci surfaces* (cu Andrei Moroianu), *Ann. Sc. Norm. Super. Pisa Cl. Sci.* **14**, no. 4 (2015), 1093–1118.
- (34) *Positivity of the renormalized volume of almost-Fuchsian hyperbolic 3-manifolds* (cu Corina Ciobotaru), *Proc. AMS.* **144** (2016), 151–159.
- (35) *The Cotton tensor and Chern-Simons invariants in dimension 3: an introduction*, *Buletinul Academiei de Științe a Republicii Moldova. Matematica* **78**, no. 2 (2015), 3–20.
- (36) *Renormalized volume on the Teichmüller space of punctured surfaces* (cu Colin Guillarmou și Frederic Rochon), *Ann. Sc. Norm. Super. Pisa, Cl. Sci.* **17** (2017), 323–384.
- (37) *On pluricanonical locally conformally Kähler manifolds* (cu Andrei Moroianu), *Int. Math. Res. Not.* **2017** (14), 4398–4405 (2017).
- (38) *Convexity of the renormalized volume of hyperbolic 3-manifolds* *Amer. J. Math* **139** (2017) 1379–1394.
- (39) *The renormalized volume and uniformisation of conformal structures*, (with Colin Guillarmou and Jean-Marc Schlenker), *J. Math. Jussieu* **17**, no. 4, 853–912 (2018).
- (40) *Boundaries of locally conformally flat manifolds in dimensions  $4k$* , *Indiana University Mathematics Journal* **67** (2018), no. 1, 329–342.
- (41) *Locally conformally Kähler manifolds with holomorphic Lee field* (with Andrei Moroianu and Liviu Ornea), *Differential Geom. Appl.* **60**, 33–38 (2018).
- (42) *Odd Pfaffian forms* (with Daniel Cibotaru), *Bull. Brazilian Math. Soc.* **52** (2021), 915–976
- (43) *Higher transgressions of the Pfaffian*, arXiv:2011.06538, *Revista Matemática Iberoamericana* **38**, no. 5 (2022), 1425–1452.
- (44) *Cauchy spinors on 3-manifolds* (with Brice Flamencourt), arXiv:2110.15386, *J. Geom. Analysis* **32**, Article number: 186 (2022).
- (45) *Concentration limit for non-local dissipative convection-diffusion kernels on the hyperbolic space*, (with Maria Del Mar González, Liviu Ignat and Dragoș Manea), arXiv:2302.02624.

## Cursuri

- “Riemannian Geometry 1”, Universitatea București, 2023–2024.
- “Complex analysis and Riemann Surfaces”, Universitatea București, 2020–2024.
- “Pseudodifferential operators and Hodge Theory”, doctoral course, Universitatea București, 2021–2022.
- “Complex analysis and Riemann Surfaces”, Universitatea București, 2020–2021.
- “Representation theory for finite and compact groups”, Universitatea București, 2019–2020.
- “Riemann Surfaces”, Universitatea București, 2019-2020.
- “ $K$ -theory and pseudodifferential operators”, SNSB, 2018–2019.
- Mini-curs “Lectures on hyperbolic geometry”, University of Iași, Oct. 2018.
- Reading course on the uniformization theorem, SNSB, 2017–2018.
- “Introduction to de Rham cohomology”, SNSB, 2015–2016.
- “The Selberg trace formula”, SNSB, 2014–2015.
- “Introduction to Chern-Simons invariants in dimension 3”, curs doctoral, Universitatea București, 2014.
- “Riemann surfaces from the geometric and analytic viewpoint”, SNSB, 2013–2014.
- Reading course on Riemann surfaces, IMAR, 2013.
- “Braid groups and mapping class groups”, SNSB, 2013.
- “Riemann surfaces”, Școala Normală Superioară București, 2009.
- Mini-curs ”Spectral asymptotics for Dirac operators”, Korea Institute of Advanced Studies summer school, 2007.
- “Varietăți hiperbolice în dimensiune 2 și 3”, Școala Normală Superioară București, 2007.
- “Topologie Algebrică”, Universitatea București, 2005.
- $K$ -teorie, Școala Normală Superioară București, 2005.
- Mini-curs “Introduction to Global Analysis”, Instituto Superior Tecnico, Lisabona, Feb. 2002.
- “Geometrie diferencială”, Universitatea Pitești, 2001.
- “Mathematical methods for engineers”, MIT, 1999.
- “Differential equations”, MIT, 1998.
- “Linear Algebra”, MIT, 1997.

## Comunicări la conferințe internaționale

- *Anderson Localization*, Auffargis, Nov. 2023.
- *Geometry beyond Riemann: Curvature and Rigidity*, Vienna, Oct. 2023.
- *Prospects in Geometry and Global Analysis*, Schloss Rauischholzhausen, Aug. 2023.
- *Arithmetic Quantum Unique Ergodicity*, Cap Ferret, Jun. 2023.
- *Semiclassical Analysis*, Auffargis, Nov. 2022.
- *Entropy of semiclassical measures*, Marseille, Jun. 2022.
- *Semiclassical trace formula*, Paris-Auffargis, Nov. 2021.
- *SSMR conference XXIII*, Pitești, Oct. 2019.
- *IMAR 70 conference*, Bucharest, Oct. 2019.
- *Conference of the Mathematical Society of the Republic of Moldova*, Chișinău, Sept. 2019.
- Geometry Day, AIC Universitatea Iași, sep. 2017.

- Geometry and PDE's, Timișoara, iun. 2016.
- MITRE 2015, Chișinău, iul. 2015.
- Géométrie spinorielle et analyse sur les variétés, Marsilia, oct. 2014.
- CAIM 2013, București, sep. 2013.
- 150 years Conference of the Science Faculty, București, aug. 2013.
- WYRM 3, Constanța, mai 2013.
- Conferința în onoarea profesoarei Cabiria Andreian-Cazacu, București, feb. 2013.
- Analysis and Geometric Singularities, Oberwolfach, mai 2012.
- Analysis, Geometry and Surfaces, Autrans, ian. 2012.
- CAIM 20, Iași, sep. 2011.
- Microlocal Methods in Math. Physics and Global Analysis, Tübingen, iun. 2011.
- Lectures on Spectral invariants and Moduli spaces, Seul, Coreea, iun. 2010.
- IMAR 60 International Conference, Iun. 2009
- *Geometric Applications of Microlocal Analysis*, Luminy, iun. 2008.
- *Workshop on Analysis and Geometry*, Hanovra, sep. 2007.
- *Spectral problems for Dirac and Laplace operators*, Paris, ian. 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, mai 2006.
- *7th 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 Marsilia, mar. 2004.
- *Operator Algebras, Singularities, Deformation Quantisation*, Potsdam, mar. 2004.
- *Operator algebras on manifolds with singularities*, Potsdam, mar. 2003.
- *Journées Nancéiennes de Géométrie*, Nancy, ian. 2003.
- *Geometric analysis and singular spaces*, Oberwolfach, iun. 2002.
- *5<sup>th</sup> Intl. Workshop on Diff. Geometry and Appl.*, Timișoara, sept. 2001.
- *Ellipticity and Parabolicity in Analysis and Geometry*, Potsdam, aug. 2001.
- *Geometric Analysis*, Potsdam, oct. 2000.
- *L<sup>2</sup>-Methods in Geometry*, Sarasota, ian. 2000.
- *4<sup>th</sup> Intl. Workshop on Differential Geometry and its Applications*, Brașov, sept. 1999.
- *Operator Algebras and Asympt. on Manifolds with Singularities*, Varșovia, apr. 1999.

### Expuneri invitate la seminarii

- 2023: Universitatea București.
- 2021: Metz; Luxembourg.
- 2020: Kampala.
- 2018: Nancy.
- 2016: Fribourg.
- 2014: IMAR.
- 2013: Universitatea București; IMAR.
- 2012: IHP Paris.
- 2011: Regensburg; Nantes.
- 2010: Toulouse; IHP Paris.

- 2009: București.
- 2007: Chișinău; Toulouse.
- 2006: Toulouse.
- 2005: Potsdam.
- 2004: București.
- 2003: Ecole Polytechnique; HU Berlin; Ecole Normale Lyon; Clermont-Ferrand.
- 2002: IST Lisabona; Paris 6.
- 2001: Paris 11; Mainz.

### Conducător doctorate

- Cipriana Anghel (2019–2023)
- Rareș Stan (2020–)

### Activități editoriale și de încadrare

- 2021-prezent: membru în Comisia de Matematică a CNCS.
- 2023 Co-organizator al secțiunii “Algebraic, Complex and Differential Geometry and Topology” al 10th Congress of Romanian Mathematicians, Pitești.
- 2021 Co-organizator al workshop-ului “Semiclassical trace formula”, Paris.
- 2020 Sesiune de antrenament IMO, Kampla.
- 2019 Co-organizator al secțiunii “Algebraic, Complex and Differential Geometry and Topology” of the Ninth Congress of Romanian Mathematicians, Galați.
- 2019 Co-organizator al Bucharest Conference on Geometry and Physics, Bucharest.
- 2019 Co-organizator al “Workshop on Riemannian and Kähler Geometry, IMAR Bucharest.
- 2018 Co-organizator al “Topology and Geometry: A conference in memory of Ștefan Papadima (1953–2018)”, București.
- 2016 (May–Nov) Membru al comisiei de matematica CNATDCU.
- 2016 Co-organizator a sesiunii speciale de Algebra, Geometry and Topology, Constanța.
- 2014 Co-organizator al celui de-al patrulea “Workshop for Young Researchers in Mathematics”, Constanța.
- 2014 Co-organizator al conferinței “Real and Complex Differential Geometry”, Universitatea București.
- 2011–2012 Membru al comisiei de matematică CNATDCU.
- 2007–2011 Co-organizator al International Workshops on Differential Geometry and its Applications: Cluj-Napoca (2007), Iași (2009) și Constanța (2011).
- 2006–2008 Directorul departamentului de matematică al Școlii Normale Superioare București.
- Editor al volumelor de proceedings pentru International Workshops on Differential Geometry and its applications: Deva 2005, Cluj-Napoca 2007, Iași 2009.
- 2005–2012: Membru în Scientific User Committee, Zentralblatt Math.
- 2002–prezent: Recenzent Zentralblatt.

### Granturi

- 2021–2023 Director de proiect, Grant PN-III-P4-ID-PCE-2020-0794 ”Spectral Methods in Hyperbolic Geometry”, buget 1,12Mlei.
- 2017–2019 Director de proiect, Grant PN-III-P4-ID-PCE-2016-0330 ”Volumul varietatilor hiperbolice si Einstein”, buget 0,85Mlei.

- 2012–2014 Director de proiect, Grant PNII-TE-0053/2011 “Quantum invariants in hyperbolic geometry”, buget 0,705Mlei.
- 2009–2011 Director de proiect, Grant PNII-ID-1188/2009 “Geometric and quantum invariants of 3-manifolds and applications”, buget 1Mlei.
- 2006 și 2007 Director pentru partea română, contract de colaborare inter-academică între Academia Română și CNRS (Franța).
- 2004–2005 Grant Marie Curie MERG 006375/2004 de reintegrare europeană.
- 2002–2004 Bursa de cercetare la Universitatea Paul Sabatier, Toulouse, Franța.
- 2001–2002 Bursa de cercetare la Universitatea Hamburg, Germania.
- 2001 Director pentru partea română, grant DFG de cooperare cu Universitatea Mainz, Germania.
- 2000 Director de proiect, grant ANSTI pentru tineri cercetători.

### **Premii**

- Premiul Ad Astra pentru Excelența în Cercetare – afiliere în România, 2014.
- 2005 Premiul “Simion Stoilov” al Academiei pe anul 2003.
- 2005 Premiul Fundației Naționale pentru Știință și Artă pe anul 2004.
- 1991 Locul 1 la Olimpiada Internațională de Matematică, Sigtuna, Suedia.
- 1991 Locul 1 la Olimpiada Balcanică de Matematică, Constanța.

### **Limbi străine**

- Franceza, engleza: fluent.
- Germana: avansat.
- Italiana, spaniola, portugheza: începător.