

RAPHAËL PONGE

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EDUCATION

- 2000 - **Université Paris 11** (Orsay, France)
Doctorat de Mathématiques (PhD degree, December 2000).
Advisor: Alain Connes (IHES-Collège de France).
- 1996 - **Ecole Normale Supérieure** (Paris, France)
Magistère de Mathématiques (Master degree, December 1996).
Advisor: Alain Connes (IHES-Collège de France).
- 1995 - **Université Paris 11** (Orsay, France)
DEA de Mathématiques Pures (Master degree, November 1995).
Advisor: Alain Connes (IHES-Collège de France).
- 1994 - **Ecole Normale Supérieure** (Paris, France)
Maîtrise de Mathématiques (BS degree, September 1994).
Major: Mathematics. Minor: Physics.

EMPLOYMENT

- 2011- now - **Seoul National University** (Seoul, South Korea)
Assistant Professor (tenure-track position).
- 2009-2011 - **University of Tokyo** (Tokyo, Japan)
- GCOE Project Associate Professor, Graduate School of Mathematical Sciences (April 2009-March 2011).
- Visiting Research Scholar, IPMU (Institute for the Physics and Mathematics of the Universe; April-July 2011).
- Research Associate, Graduate School of Mathematical Sciences (April -July 2011).
- 2005-2009 - **University of Toronto** (Toronto, Canada)
Assistant Professor (3-year contract).
- 2005-2006 - **Max Planck Institute** (Bonn, Germany)
Member (Jan. 1-May 15).
- **University of Tokyo** (Tokyo, Japan)
Visiting Research Scholar (Oct. 31-Dec. 23) and JSPS Fellow (May 15-July 31).
- **UC Berkeley** (Berkeley, CA, USA)
Visiting Scholar (July 28-Oct. 22). Host: M. Rieffel.
- 2002-2005 - **Ohio State University** (Columbus, USA)
Zassenhaus Assistant Professor.
- 2001-2002 - **Pennsylvania State University** (University Park, USA)
Visiting Assistant Professor.
- 2000-2001 - **Humboldt University at Berlin**,in (Berlin, Germany)
Postdoctoral Fellow of the European Network *Geometric Analysis* (Apr. 1-Jul. 28).
- **University of Postdam** (Postdam, Germany)
Predoctoral Fellow (Oct. 1-Dec. 31) and Postdoctoral Fellow (Jan. 1-Mar. 31) of the European Network *Geometric Analysis*.
- 1998-2000 - **Ecole Normale Supérieure** (Lyon, France)
Agrége préparateur (special graduate instructorship position).
- 1995-1998 - **University of Paris-Sud** (Orsay, France)
Teaching Assistant and Fellow of the French Ministry of National Education and Research.

PUBLICATIONS

- [1] *On the singularities of the zeta and eta functions of an elliptic operator* (with Paul Loya and Sergiu Moroianu). E-print, arXiv, Oct. 2010. To appear in *Int. J. Math.*
- [2] *A new hypoelliptic operators on almost CR manifolds*. *Rev. Mat. Iberoamericana* **27** (2011), no. 2, 393–414.
- [3] *A microlocal approach to Fefferman’s program in conformal and CR geometry*. *Motives, Quantum Field Theory and Pseudodifferential Operators* (Boston University, USA, June 1-14, 2008), *Clay Math. Proc.*, 12, Amer. Math. Soc., Providence, RI, 2011, pp. 219–242.
- [4] *Traces on pseudodifferential operators and sums of commutators*. *J. Anal. Math.* **110** (2010) 1-30.
- [5] *Noncommutative residue invariants for CR and contact manifolds*. *J. Reine Angew. Math. (Crelle’s Journal)* **614** (2008) 117–151. *
- [6] *Noncommutative geometry and lower dimensional volumes in Riemannian geometry*. *Lett. Math. Phys.* **83** (2008) 19–32.
- [7] *Noncommutative residues and new invariants for CR and contact manifolds*. *Traces in Geometry, Number Theory and Quantum Fields* (Max Planck Insititute, Bonn, Germany, Oct. 24 - 28, 2005), *Aspects of Mathematics*, Vieweg Verlag, 179–186, 2008.
- [8] *Noncommutative residue for Heisenberg manifolds and applications in CR and contact geometry*. *J. Funct. Anal.* **252** (2007) 399–463.
- [9] *Heisenberg calculus and spectral theory of hypoelliptic operators on Heisenberg manifolds*. *Mem. Amer. Math. Soc.* **194** (2008) no. 906, vi+134 pp.. *
- [10] *Spectral asymmetry, zeta functions and the noncommutative residue*. *Int. J. Math.* **17** (2006) 1065–1090.
- [11] *The tangent groupoid of a Heisenberg manifold*. *Pacific J. Math.* **227** (2006) 151–175.
- [12] *A new proof of the regularity of the eta invariant for Dirac operators*. *J. Geom. Phys.* **56** (2006) 1654–1665.
- [13] *Analogues of the holomorphic Morse inequalities in CR geometry*. *Hayama symposium in several complex variables* (Hayama, Japan, Dec. 18-21, 2005), 6 pages.
- [14] *Szegő projections and new invariants for CR and contact manifolds*. *Analytic geometry of the Bergman kernel and related topics* (RIMS, Kyoto University, Japan, Dec. 12-16, 2005), 13 pages.
- [15] *A new short proof of the Atiyah-Singer index formula*. *Noncommucative Geometry and Number Theory* (Max Planck Institute, Bonn, Aug. 17-22, 2003), 361–372, *Aspects of Mathematics*, Vieweg Verlag, 2006.
- [16] *On the asymptotic completeness of the Volterra calculus*. *J. Anal. Math.* **94** (2004) 249–263.
- [17] *A new short proof of the local index formula and some of its applications*. *Comm. Math. Phys.* **241** (2003) 215–234.
- [18] *Géométrie spectrale et formules d’indices locales pour les variétés CR et contact*. *C. R. Acad. Sci. Paris, Série I*, **332** (2001) 735–738.
- [19] *Calcul fonctionnel sous-elliptique et résidu non commutatif sur les variétés de Heisenberg*. *C. R. Acad. Sci. Paris, Série I*, **332** (2001) 611–614.

AWARDS AND GRANTS

2010-2011 - JSPS Grant-in-Aid for Young Scientists (B).

2009-2010 - JSPS Grant-in-Aid for Young Scientists (start-up).

2007-2009 - NSERC Discovery Grant.

2007-2009 - New Staff Matching Grant, Connaught Fund, University of Toronto.

2006-2009 - Start-up research grant, University of Toronto.

2006-2007 - JSPS Fellowship (11 months, reduced to 12 weeks in Spring 2006 due to conflict with a position at the University of Toronto).

2004-2005 - NSF Grant DMS 0409005.

1995-1998 - Graduate Fellowship of the French Ministry of National Education and Research.

GRADUATE STUDENTS SUPERVISION

2007-2009 - **Alan Chung Lung Lai** (University of Toronto)
PhD student. PhD topic: *Type II index theory and quantum gravity*. (Transferred to Prof. Meinrenken after I left Toronto.)

2008-2009 - **Daniel Rowe** (University of Toronto)
Master student. Master obtained in Summer 2009.

TEACHING EXPERIENCE

2009-2011 - **University of Tokyo** (Japan)

- *Introduction to Noncommutative Geometry* (graduate course, Winter 2010-2011).
- *Pseudodifferential Operators and Applications* (graduate course, Summer 2010).
- *Introduction to Noncommutative Geometry. II* (graduate course, Winter 2009-2010).
- *Introduction to Noncommutative Geometry. I* (graduate course, Summer 2009).

2006-2009 - **University of Toronto** (Canada)

- *Introduction to Noncommutative Geometry* (graduate course, lectures, Spring 2008 & 2009).
- *Linear Algebra I* (undergraduate course, lectures, Spring 2009).
- *Ordinary Differential Equations* (undergraduate course, lectures and coordination, Spring 2007).
- *Calculus* (undergraduate course, lectures, year-course, 2006-2007, 2007-2008).

2002-2005 - **Ohio State University** (Columbus, OH, USA)

- *Distribution Theory* (graduate course, lectures, Spring 2004; lectures and recitations, Spring 2005).
- *Measure Theory and Integration* (graduate course, recitations, Fall 2004).
- *Introductory Linear Algebra* (undergraduate course, lectures, Spring 2004).
- *Ordinary Differential Equations* (undergraduate course, lectures and recitations, Fall 2002; lectures, Winter & Spring 2003).
- *Calculus III* (undergraduate course, lectures, Fall 2003).

2001-2002 - **Pennsylvania State University** (University Park, PA, USA)

- *Calculus II* (undergraduate course, lectures and recitations, Spring 2002).
- *Calculus I* (undergraduate course, lectures and recitations, Fall 2001).

1998-2000 - **Ecole Normale Supérieure** (Lyon, France)

- *Introduction to Projective Geometry* (graduate course, lectures).
- *Leçons pour l'Agrégation* (graduate course, synthesis lectures on various subjects like the notion of quotient in algebra and geometry, the inverse function theorem and applications, examples of uses of uniform continuity in analysis).
- *Pseudodifferential Operators and Microlocal Analysis* (undergraduate course, recitations, Spring 1999).
- *Measure Theory and Integration* (undergraduate course, recitations, Fall 1999).

1996-1998 - **Université Paris 11** (Orsay, France)

- *Analysis III and Linear Algebra* (undergraduate course, recitations, Fall 1997).
- *Analysis II* (undergraduate course, recitations, Spring 1997).

SHORT TERM VISITS

2011-2012 - **Australian National University** (Canberra, Australia)

Visiting Scholar (Sep. 8-17). Hosts: A. Carey and M. Eastwood.

- **IPMU, University of Tokyo** (Kashiwa, Japan)

Visiting Research Scholar (Aug. 8- Sep. 1, 2011).

- **Academia Sinica** (Taipei, Taiwan)

Visiting Scholar (Apr. 27-May 5). Host: J.H. Cheng.

2010-2011 - **McGill University** (Montreal, QC, Canada)

Visiting Scholar (Jan. 15-Feb. 26). Host: D. Jakobson.

- **Ecole Normale Supérieure** (Paris, France)
Visiting Researcher (Dec. 19-24 & Jan. 3-5). Host: C. Guillarmou.
- **University of Auckland** (Auckland, New Zealand)
Visiting Scholar (Oct. 17-21). Host: A.R. Gover.
- **Korean Institute of Advanced Study** (Seoul, South Korea)
Visiting Researcher (Sep. 5-21). Host: J. Park.
- **McGill University** (Montreal, QC, Canada)
Visiting Scholar (Jul. 16-Sep. 2). Host: D. Jakobson.
- 2009-2010 - **UC Berkeley** (Berkeley, CA, USA)
Visiting Scholar (Apr. 27-May 8). Host: J. Lott.
- **Ohio State University** (Columbus, OH, USA)
Visiting Professor (Feb. 17-Mar. 14). Host: H. Moscovici.
- **Academia Sinica** (Taipei, Taiwan)
Visiting Scholar (Oct. 30-Nov. 5). Host: P. Greiner.
- **Université du Québec à Montréal** (Montréal, QC, Canada)
Visiting Scholar (Sep. 10-Oct. 3). Host: V. Aspotolov.
- **University of Toronto** (Toronto, ON, Canada)
Visiting Scholar (Aug. 14-Sep. 1).
- 2008-2009 - **Université du Québec à Montréal** (Montréal, QC, Canada)
Visiting Scholar (Feb. 11-22). Host: V. Aspotolov.
- **MSRI** (Berkeley, CA, USA)
Member (Aug. 15-Dec. 13; Analysis on Singular Spaces' program.)
- 2007-2008 - **McGill University** (Montréal, QC, Canada)
Visiting Scholar (May 3-June 30). Host: D. Jakobson.
- **Boston University** (Boston, MA, USA)
Visiting Scholar (April 14 - May 1). Host: S. Rosenberg.
- **Columbia University** (New York, NY, USA)
Visiting Scholar (Feb. 15-Feb. 26). Host: C. Fefferman.
- 2006-2007 - **IHÉS** (Bures-sur-Yvette, France)
Member (Aug. 4-Sep. 1).
- **UC Berkeley** (Berkeley, CA, USA)
Visiting Scholar (May 3-Jul. 31). Host: A. Weinstein.
- 2004-2005 - **Harvard University** (Cambridge, MA, USA)
Visiting Scholar (Feb. 28-Mar. 26). Host: Y.T. Siu.
- **Princeton University** (Princeton, NJ, USA)
Visiting Fellow (Jan. 25-Feb. 28). Host: C. Fefferman.
- 2003-2004 - **University of Adelaide** (Adelaide, Australia)
Visiting Scholar (July. 8-Aug. 6).
- **IHES** (Bures-sur-Yvette, France)
Member (Jan. 2-Jan 31).
- 2002-2003 - **Max Planck Institute** (Bonn, Germany)
Member (Aug. 1-Aug. 29).
- **Mathematical Research Institute** (Oberwolfach, Germany)
Research in Pair (Jul. 20-Aug. 1).
- 2001-2002 - **Erwin Schrödinger Institute** (Vienna, Austria)
Member (Aug. 30-Sep. 14).
- **Ohio State University** (Columbus, USA)
Visiting Scholar (Jul. 29-Aug. 28).
- **Humboldt University at Berlin** (Germany)
Postdoctoral Fellow (Jun. 18-Jul. 26).
- **IHES** (Bures-sur-Yvette, France)
Member (May. 14-Jun. 14).

LECTURE SERIES

- 2010-2011 - **Chulalongkorn University** (Bangkok, Thailand)
 CIMPA School *Spectral Triples and Applications* (May 23 - June 3)
Noncommutative geometry and group actions (six 90-minute lectures).
- **University of Western Ontario** (London, ON, Canada)
Noncommutative geometry and group actions (three 1-hour lectures, February 14-15).
- **McGill University** (Montreal, QC, Canada)
Fefferman program and Green functions of conformally invariant operators (five 90-minute lectures, August 2-11 2010).
- 2009-2010 - **Ohio State University** (Columbus, OH, USA)
 Special year *Noncommutative geometry and Number Theory*
The local index formula in noncommutative geometry and applications in transverse geometry
 (four 90-minute lectures, March 5-12, 2010).

SELECTED PRESENTATIONS

- Aug. 2011 - Seminar of Mathematics, KIAS (Korean Institute of Advanced Study), Seoul, South Korea, August 4.
- July 2011 - Kyoto Symposium on Complex Analysis in Several Variables XIV, Kyoto University, Kyoto, Japan, July 21.
- July 2011 - Operator Algebras Seminar, University of Tokyo, Tokyo, Japan, July 14.
- July 2011 - Geometric Complex Analysis Seminar, University of Tokyo, Tokyo, Japan, July 4.
- May 2011 - Spring Institute on Noncommutative Geometry and Operator Algebras, Vanderbilt University, Nashville, USA, May 14.
- May 2011 - Geometry Seminar, Academia Sinica, Taipei, Taiwan, May 2.
- Apr. 2011 - Geometry Seminar, Academia Sinica, Taipei, Taiwan, April 29.
- Mar. 2011 - Operator Theory Seminar, University of Victoria, Victoria, BC, Canada, March 2.
- Mar. 2011 - Differential Geometry, Mathematical Physics and PDEs Seminar, University of British Columbia, Vancouver, BC, Canada, March 1.
- Feb. 2011 - Differential Geometry and Geometric Analysis Seminar, Princeton University, Princeton, NJ, USA, February 11.
- Feb. 2011 - Operator Theory Seminar, University of Toronto, Toronto, ON, Canada, February 7.
- Jan. 2011 - Operator Algebras Seminar, University of Tokyo, Tokyo, Japan, January 11.
- Jan. 2011 - Topology Seminar, University of Tokyo, Tokyo, Japan, December 7.
- Nov. 2010 - Tambara Workshop on Parabolic Geometries and Related Topics, Tambara Seminar House, University of Tokyo, Japan (Nov. 2-5).
- Oct. 2010 - Mathematics Seminar, Institute for the Physics and Mathematics of the Universe, University of Tokyo, Tokyo, Japan, October 28.
- Oct. 2010 - Analysis Seminar, University of Auckland, New Zealand, October 18.
- Sep. 2010 - Functional Analysis Seminar, Seoul National University, Seoul, South Korea, September 17.
- Sep. 2010 - Colloquium, Sungkyunkwan University, Suwon, South Korea, September 16.
- Sep. 2010 - Seminar of Mathematics, Korean Institute of Advanced Study (KIAS), Seoul, South Korea, September 8.
- Nov. 2009 - Colloquium, Academia Sinica, Taipei, Taiwan.
- Aug. 2009 - Bimonthly Canadian Noncommutative Geometry Workshop, Fields Institute, Toronto, Canada, August 14.
- July 2009 - Hayama Symposium on Complex Analysis in Several Variables, Hayama, Japan, July 20-23.
- May 2009 - Operator Algebras Seminar, University of Tokyo, Tokyo, Japan, May 14.
- March 2009 - Analysis Seminar of Montreal, McGill University, Montréal, Canada, March 20.
- Feb. 2009 - Geometry and Topology Seminar of Montreal, University of Québec at Montréal, Montréal, Canada, Feb. 20.

- July 2008 - Complex and CR Geometry, Partial Differential Equations and Invariant Theory (in honor of J.J. Kohn), Prague, Czech Republic, June 30-July 4.
- June 2008 - Motives, Quantum Field Theory and Pseudodifferential Operators, Boston University, USA, June 1-14.
- June 2008 - 2nd Congress Canada-France (joint CMS-SMF), special session on K -Theory and Noncommutative Geometry, Université du Québec à Montréal, Canada, June 1-6.
- May 2008 - Noncommutative Geometry, Fields Institute, Toronto, Canada, May 27-31.
- Dec. 2007 - Winter CMS Meeting 2007, Special Session on Noncommutative Geometry, University of Western Ontario, London, Canada.
- Mar. 2007 - Operator Theory Seminar, University of Toronto, Canada.
- Dec. 2006 - Trends in Noncommutative Geometry, Newton Institute, Cambridge, UK, Dec. 17-22 (poster presentation).
- Dec. 2006 - ISAAC Workshop on Pseudo-Differential Operators: Partial Differential Equations and Time-Frequency Analysis, Fields Institute, Toronto, Canada, Dec. 11-15.
- Nov. 2006 - Analysis Seminar, York University, Toronto, Canada.
- Nov. 2006 - PDE/Applied Mathematics/Analysis Seminar, University of Toronto, Canada.
- Aug. 2006 - Noncommutative Geometry and Cyclic Cohomology, Newton Institute, Cambridge, UK, July 31-Aug. 4.
- Dec. 2005 - Hayama symposium in Several Complex Variables, Hayama, Japan, December 18-21.
- Dec. 2005 - Analytic Geometry of the Bergman Kernel and Related Topics, RIMS, Kyoto, Japan, December 12-16.
- Nov. 2005 - Operator Algebra Seminar, University of Tokyo, Japan.
- Nov. 2005 - Seminar on Geometric Complex Analysis, University of Tokyo, Japan.
- Oct. 2005 - Traces in Geometry, Number Theory and Quantum Fields, Max Planck Institute, Bonn, Germany, October 24-28.
- Oct. 2005 - PDE and Geometry Seminar, University of Washington, Seattle, USA.
- Oct. 2005 - Special Lecture, UC Davis, USA.
- Oct. 2005 - Geometry Seminar, Stanford University, USA.
- Sept. 2005 - Symplectic Geometry Seminar, UC Berkeley, USA.
- Mar. 2005 - Analysis and Geometry Seminar, Northeastern University, USA.
- Mar. 2005 - Geometry Seminar, Boston University, Boston, USA.
- Mar. 2005 - Colloquium, UC Riverside, Riverside, USA.
- Feb. 2005 - Colloquium, IUPUI, Indianapolis, USA.
- Feb. 2005 - Heisenberg Group Seminar, SUNY Stony Brook, Stony Brook, USA.
- Feb. 2005 - Analysis Seminar, Princeton University, Princeton, USA.
- Sep. 2004 - Noncommutative Geometry, The Local Index Formula and Hopf Algebras, Fields Institute, Toronto, Canada.
- May 2004 - 2nd Spring Institute on Noncommutative Geometry and Operator Algebras, Vanderbilt University, Nashville, USA.
- Apr. 2004 - Special Session on CR Geometry and Singularities, Spring Eastern Section AMS Meeting, Lawrenceville, NJ, April 17-18, 2004.
- Mar. 2004 - Asymptotic and Effective Results in Complex Geometry (in honor of Bernard Shiffman's 60th birthday), Johns Hopkins University, Baltimore, March 15-21, 2004.
- Aug. 2003 - Noncommutative Geometry and Number Theory, Max Planck Institute, Bonn, Germany.
- May 2003 - 1st Spring Institute on Noncommutative Geometry and Operator Algebras, Vanderbilt University, Nashville, USA.
- Apr. 2003 - Noncommutative Geometry, BIRS, Banff, Canada.
- Oct. 2001 - West Coast Operator Algebra Seminar, Arizona State University, Tempe, USA.

- May 2001 - Geometric Scattering Theory and Elliptic Theory on Singular and Noncompact Spaces, MSRI, Berkeley.
- Feb. 2001 - Spring school on PDEs, Potsdam, Germany.
- Oct. 1999 - Annual meeting of the French Operator Algebras Network, Paris, France.
- Aug. 1998 - International Congress of Mathematicians, short communication, Berlin, Germany.

ADMINISTRATIVE RESPONSABILITIES

- 2008-2009 - **PIMS-University of British Columbia, Vancouver, BC, Canada**
Co-organiser of the AMS special session on noncommutative geometry, Oct. 4-5.
- 2007-2008 - **Fields Institute, Toronto, ON, Canada**
Co-organizer of the 36th Canadian Annual Symposium on Operator Algebras and Their Applications (COSy), May 20-24.
- 2002-2004 - **Ohio State University, Columbus, OH, USA**
Co-organizer of the Geometric Analysis seminar.
- 1999-2000 - **Ecole Normale Supérieure of Lyon, France**
Co-organizer of the seminar of Pure Mathematics.
- 1998-1999 - **Ecole Normale Supérieure of Lyon, France**
Co-organizer of the internal seminar of the Math Department.
- 1997-1998 - **University of Paris-Sud (Orsay, France)**
Vice-Secretary of the Graduate Student Association.
- 1996-1998 - **University of Paris-Sud (Orsay, France)**
Tutorials on Mathematics at the Undergraduate Help Center (La Boutique).

PEER-REVIEWED ACTIVITIES

- Referee for *Advances in Mathematics*, *Central European Journal of Mathematics*, *International Journal of Mathematics*, *Journal d'Analyse Mathématique*, *Journal of Functional Analysis*, *Journal of Geometry and Physics*, *Journal of Geometric Analysis*, *Journal of Noncommutative Geometry*, *Journal of Physics A: Mathematical and Theoretical*, *Journal of the Australian Mathematics Society*, *Mathematische Zeitschrift*, *Pacific Journal of Mathematics*, *SIGMA (Symmetry, Integrability and Geometry: Methods and Applications)*, and *Transactions of the AMS*.
- External referee for NSERC discovery grant applications.
- Reviewer for *Mathematical Reviews*.