

# RAPHAËL PONGE

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## EDUCATION

- 2000 - **University of Paris 11** (Orsay, France)  
PhD in Mathematics (December 2000).  
Thesis title: *Calcul hypoelliptique sur les variétés de Heisenberg, résidu non commutatif et géométrie pseudo-hermitienne* (Hypoelliptic calculus on Heisenberg manifolds, noncommutative residue, and pseudo-Hermitian geometry).  
Advisor: Alain Connes (IHÉS-Collège de France).
- 1995 - **University of Paris 11** (Orsay, France)  
MSc in Pure Mathematics (November 1995).
- 1993-1996 - **Ecole Normale Supérieure** (Paris, France)  
Magistère de Mathématiques (3-year special postgraduate program) (December 1996<sup>1</sup>).  
Agégation de Mathématiques (civil service competitive examination in Mathematics) (July 1995).  
BSc hon. in Applied Mathematics (maîtrise de mathématiques appliquées) (September 1994<sup>2</sup>).
- 1993 - **University of Paris 6** (Paris, France)  
BSc in Mathematics *summa cum laude* (June 1993).

## EMPLOYMENT

- From 2019 - **Sichuan University** (Chengdu, China)  
Professor.
- 2011-2019 - **Seoul National University** (Seoul, South Korea)  
Associate Professor (September 2018-February 2019).  
Assistant Professor (August 2011-August 2018).
- 2009-2011 - **University of Tokyo** (Tokyo, Japan)  
GCOE Project Associate Professor (non-tenure-track position).
- 2006-2009 - **University of Toronto** (Toronto, Canada)  
CLTA Assistant Professor (non-tenure-track position).
- 2002-2005 - **Ohio State University** (Columbus, USA)  
Zassenhaus Assistant Professor (non-tenure-track position).
- 2001-2002 - **Pennsylvania State University** (University Park, USA)  
Visiting Assistant Professor.

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<sup>1</sup>Degree awarded by University of Paris 11.

<sup>2</sup>Degree awarded by University of Paris 6.

- 2000-2001 - **Humboldt University at Berlin** (Berlin, Germany)  
 Postdoc (April-July 2001).  
 - **University of Postdam** (Postdam, Germany)  
 Predoc (October-December 2000) and Postdoc (January-March 2001).
- 1998-2000 - **Ecole Normale Supérieure** (Lyon, France)  
 Agrégé préparateur (special graduate instructorship position).
- 1995-1998 - **University of Paris 11** (Orsay, France)  
 Teaching Assistant (1996-1998).  
 PhD Fellow of the French Ministry of Education and Research (1995-1998).

#### VISITING POSITIONS

- 2018-2019 - **University of Québec at Montréal** (Montréal, Canada)  
 Visiting Professor (July 1, 2018-February 28, 2019).
- 2014-2015 - **Institut des Hautes Études Scientifiques (IHÉS)** (Bures-sur-Yvette, France)  
 Visitor (December 15, 2014-January 16, 2016).  
 - **University of California** (Berkeley, USA)  
 Visiting Scholar (June 1, 2014-May 31, 2015).
- 2013-2014 - **Korean Institute for Advanced Study (KIAS)** (Seoul, South Korea)  
 Research Associate (April 1, 2013-December 31, 2014).
- 2012 - **Australian National University** (Canberra, Australia)  
 Visiting Fellow (July 31-September 1, 2012).
- 2011 - **Research Institute for Mathematical Sciences (RIMS)** (Kyoto, Japan)  
*Operator Algebras and Applications*.  
 Visiting Research Scholar (December 7-29, 2011).  
 - **Institute for the Physics and Mathematics of the Universe (IPMU)** (Tokyo, Japan)  
 Visiting Research Scholar (April 1-July 31, 2011 & August 8-31, 2011).  
 - **University of Tokyo** (Tokyo, Japan)  
 Research associate (April 1-August 31, 2011).
- 2010 - **Ohio State University** (Columbus, OH, USA)  
*Special year on Noncommutative Geometry and Number Theory*.  
 Visiting Professor (February 17-March 14, 2010).
- 2008 - **Mathematical Science Research Institute (MSRI)** (Berkeley, USA)  
*Analysis on Singular Spaces*.  
 Member (August 15-December 13, 2008).
- 2007 - **Institut des Hautes Études Scientifiques (IHÉS)** (Bures-sur-Yvette, France)  
 Visitor (August 4-September 1, 2007).
- 2006 - **University of Tokyo** (Tokyo, Japan)  
 JSPS postdoc fellow (May 19-July 29, 2006).  
 - **Max Planck Institute for Mathematics** (Bonn, Germany)  
 Visiting Scientist (January 1-May 15, 2006).
- 2005 - **University of Tokyo** (Tokyo, Japan)  
 Visiting Research Scholar (November 1-December 23, 2005).

- **University of California** (Berkeley, USA)  
Visiting Scholar (July 31-October 23, 2005).
- **Harvard University** (Cambridge, USA)  
Visiting Fellow (March 1-31, 2005).
- **Princeton University** (Princeton, USA)  
Visiting Fellow (January 25-February 28, 2005).
- 2004 - **Institut des Hautes Études Scientifiques (IHÉS)** (Bures-sur-Yvette, France)  
Visitor (January 2-31, 2004).
- 2003 - **Max Planck Institute for Mathematics** (Bonn, Germany)  
Visiting Scientist (August 1-29, 2003).
- 2003 - **Mathematisches Forschungsinstitut Oberwolfach (MFO)** (Oberwolfach, Germany)  
Research in Pair (July 20-August 1, 2003).
- 2002 - **Ohio State University** (Columbus, USA)  
Visiting Research Scholar (July 29-August 28, 2002).
- **Erwin Schrödinger Institute** (Vienna, Austria)  
*Aspects of Foliation Theory in Geometry, Topology and Physics.*  
Scientific Guest (August 30-September 14, 2002).
- **Humboldt University** (Berlin, Germany)  
Postdoc (June 18-July 26, 2002).
- **Institut des Hautes Études Scientifiques (IHÉS)** (Bures-sur-Yvette, France)  
Visitor (May 14-June 14, 2002).

#### LIST OF PUBLICATIONS

##### Submitted Articles.

- [1] *Laplace-Beltrami operators on noncommutative tori* (with Hyunsu Ha). Preprint, [arXiv:1905.09048](https://arxiv.org/abs/1905.09048), 28 pages.

##### Accepted and Published Articles.

- [2] *Para-S-modules and perturbation lemmas*. Preprint, [arXiv:1810.04835](https://arxiv.org/abs/1810.04835), 49 pages. To appear in *J. Noncommut. Geom.*
- [3] *Pseudodifferential calculus on noncommutative tori, I. Oscillating integrals* (with Hyunsu Ha et Gihyun Lee). *Int. J. Math.* **30**(5) (2019), 1950033 (74 pages).
- [4] *Pseudodifferential calculus on noncommutative tori, II. Main Properties* (with Hyunsu Ha et Gihyun Lee). *Int. J. Math.* **30**(5) (2019), 1950034 (73 pages).
- [5] *Privileged coordinates and nilpotent approximation for Carnot manifolds, II. Carnot coordinates* (with Woocheol Choi). *J. Dyn. Control Syst.* **25** (2019), 631–670.
- [6] *Tangent maps and tangent groupoid for Carnot manifolds* (with Woocheol Choi). *Differential Geom. Appl.* **62** (2019), 136–183.
- [7] *Privileged coordinates and nilpotent approximation for Carnot manifolds, I. General results* (with Woocheol Choi). *J. Dyn. Control Syst.* **25** (2019), 109–157.
- [8] *Noncommutative geometry and conformal geometry. I. Local index formula and conformal invariants* (with Hang Wang). *J. Noncommut. Geom.* **12** (2018), 1573–1639.

- [9] *Cyclic homology and group actions*. J. Geom. Phys. **123** (2018), 30–52 (virtual special issue in honor of Alain Connes).
- [10] *The Cyclic homology of crossed-product algebras, I*. C. R. Acad. Sci. Paris, Sér. I **355** (2017), 618–622.
- [11] *The Cyclic homology of crossed-product algebras, II*. C. R. Acad. Sci. Paris, Sér. I **355** (2017), 623–627.
- [12] *Index map,  $\sigma$ -connections and Connes-Chern character in the setting of twisted spectral triples* (with Hang Wang). Kyoto Math. J. **56** (2016), 347–399.
- [13] *Noncommutative geometry and conformal geometry. II. Connes-Chern character and the local equivariant index theorem* (with Hang Wang). J. Noncommut. Geom. **10** (2016), 307–378.
- [14] *Noncommutative Geometry and Conformal Geometry. III. Vafa-Witten Inequality and Poincaré Duality* (with Hang Wang). Adv. Math. **272** (2015), 761–819.
- [15] *The Logarithmic singularities of the Green functions of the conformal powers of the Laplacian*. Contemp. Math. Vol. 630 (2014), pp. 247–273.
- [16] *Conformal Invariants from Nodal Sets. I. Negative Eigenvalues and Curvature Prescription* (with Yaiza Canzani, Rod Gover and Dmitry Jakobson). Int. Math. Res. Notices **2014** (2014), 2356–2400
- [17] *Nullspaces of conformally invariant operators. Applications to  $Q$ -curvature*. (with Yaiza Canzani, Rod Gover and Dmitry Jakobson). Electron. Res. Announc. Math. Sci. **20** (2013) 43–50.
- [18] *On the singularities of the zeta and eta functions of an elliptic operator* (with Paul Loya and Sergiu Moroianu). Int. J. Math. **23** (2012), no. 6, 1–26.
- [19] *A new hypoelliptic operators on almost CR manifolds*. Rev. Mat. Iberoamericana **27** (2011), no. 2, 393–414.
- [20] *A microlocal approach to Fefferman’s program in conformal and CR geometry*. Clay Math. Proc., 12, Amer Math. Soc., Providence, RI, 2011, pp. 219–242.
- [21] *Traces on pseudodifferential operators and sums of commutators*. J. Anal. Math. **110** (2010) 1–30.
- [22] *Noncommutative residue invariants for CR and contact manifolds*. J. Reine Angew. Math. (Crelle’s Journal) **614** (2008) 117–151.
- [23] *Noncommutative geometry and lower dimensional volumes in Riemannian geometry*. Lett. Math. Phys. **83** (2008) 19–32.
- [24] *Noncommutative residues and new invariants for CR and contact manifolds. Traces in Geometry, Number Theory and Quantum Fields* (Max Planck Insitute, Bonn, Germany, Oct. 24 - 28, 2005), Aspects of Mathematics, Vieweg Verlag, 179–186, Vieweg Verlag, 2008.
- [25] *Noncommutative residue for Heisenberg manifolds and applications in CR and contact geometry*. J. Funct. Anal. **252** (2007) 399–463.
- [26] *Heisenberg calculus and spectral theory of hypoelliptic operators on Heisenberg manifolds*. Mem. Amer. Math. Soc. **194** (2008) no. 906, vi+134 pp..
- [27] *Spectral asymmetry, zeta functions and the noncommutative residue*. Int. J. Math. **17** (2006) 1065–1090.

- [28] *The tangent groupoid of a Heisenberg manifold.* Pacific J. Math. **227** (2006) 151–175.
- [29] *A new proof of the regularity of the eta invariant for Dirac operators.* J. Geom. Phys. **56** (2006) 1654–1665.
- [30] *A new short proof of the Atiyah-Singer index formula.* Noncommutative Geometry and Number Theory (Max Planck Institute for Mathematics, Bonn, Aug. 17-22, 2003), 361–372, Aspects of Mathematics, Vieweg Verlag, 2006.
- [31] *Analogues of the holomorphic Morse inequalities in CR geometry.* Hayama symposium in several complex variables (Hayama, Japan, Dec. 18-21, 2005), 6 pages.
- [32] *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.
- [33] *On the asymptotic completeness of the Volterra calculus.* J. Anal. Math. **94** (2004) 249–263.
- [34] *A new short proof of the local index formula and some of its applications.* Comm. Math. Phys. **241** (2003) 215–234.
- [35] *Géométrie spectrale et formules d'indices locales pour les variétés CR et contact.* C. R. Acad. Sci. Paris, Série I, **332** (2001) 735–738.
- [36] *Calcul fonctionnel sous-elliptique et résidu non commutatif sur les variétés de Heisenberg.* C. R. Acad. Sci. Paris, Série I, **332** (2001) 611–614.

### Unpublished Manuscripts.

- [37] *Logarithmic singularities of Schwartz kernels and local invariants of conformal and CR structures.* E-print arXiv:0710.5783, October 2007, 44 pages.
- [38] *Comments on: "Operator K-theory for the group  $SU(n,1)$ " by P. Julg and G. Kasparov.* E-print arXiv:math/0601528, January 2006, 7 pages.

### GRADUATE STUDENT SUPERVISION

#### PhD Students.

- **Gihyun Lee** (Seoul National University, PhD 2018).  
Thesis title: *Pseudodifferential calculus on noncommutative tori. Resolvents and complex powers of elliptic operators.*  
BK21 Postdoc at Seoul National University (effective Sep. 1, 2018).
- **Hyun-su Ha** (Seoul National University, PhD 2018).  
Thesis title: *Pseudodifferential calculus and Laplacians associated with Riemannian metrics on noncommutative tori.*
- **Woocheol Choi** (Seoul National University, PhD 2015)  
Thesis title: *Oscillatory integrals, spectral multiplier operators, semilinear elliptic equations, and pseudodifferential calculus on carnot manifolds.*  
Assistant Professor at Incheon National University (Incheon, South Korea).
- **Alan Chung Lung Lai** (University of Toronto, PhD 2011)  
Co-supervised with G. Elliott and E. Meinrencken.  
Thesis Title: *On the JLO Character and Loop Quantum Gravity.*

**Master Students.**

- **Ji Myeong Lee** (Seoul National University, MSc 2013)  
Thesis title: *Pseudodifferential Operators*.
- **Daniel Rowe** (University of Toronto, MSc 2009)  
Master project: *The Dixmier trace*.

## TEACHING EXPERIENCE

- 2018-2019 - **Sichuan University** (Chengdu, China).  
 - *Representation Theory* (undergraduate course, Spring 2019).  
 - *Differential Geometry* (undergraduate course, Spring 2019).
- 2011-2018 - **Seoul National University** (Seoul, South Korea).  
 - *Introduction to Noncommutative Geometry* (graduate course, Spring 2012 & Spring 2018).  
 - *Introduction to Quantum Groups* (graduate course, Spring 2013).  
 - *Functional Analysis 2* (graduate course, Fall 2012, Fall 2016 & Fall 2017)  
 - *Functional Analysis 1* (graduate course, Spring 2014, Spring 2016 & Spring 2017)  
 - *Differential Equations* (undergraduate course, Fall 2013, Fall 2015 & Fall 2017)  
 - *Introduction to Linear Algebra* (undergraduate course, Fall 2011, Fall 2013 & Fall 2015).  
 - *Honors Calculus 2* (multivariable calculus, undergraduate course, Fall 2016).  
 - *Calculus 2* (multivariable calculus, undergraduate course, Fall 2011 & Fall 2012).  
 - *Calculus 1* (undergraduate course, Spring 2018).
- 2009-2011 - **University of Tokyo** (Tokyo, Japan)  
 - *Introduction to Noncommutative Geometry* (graduate course, Fall 2010).  
 - *Pseudodifferential Operators and Applications* (graduate course, Spring 2010).  
 - *Introduction to Noncommutative Geometry. II* (graduate course, Fall 2009).  
 - *Introduction to Noncommutative Geometry. I* (graduate course, Spring 2009).
- 2006-2009 - **University of Toronto** (Toronto, Canada)  
 - *Introduction to Noncommutative Geometry* (graduate course, Spring 2008 & 2009).  
 - *Linear Algebra I* (undergraduate course, Spring 2009).  
 - *Ordinary Differential Equations* (undergraduate course, Spring 2007).  
 - *Calculus* (undergraduate course, year-course, academic years 2006-2007 & 2007-2008).
- 2002-2005 - **Ohio State University** (Columbus, OH, USA)  
 - *Distribution Theory* (graduate course, lectures and recitations, Spring 2005).  
 - *Distribution Theory* (graduate course, lectures, Spring 2004).  
 - *Measure Theory and Integration* (graduate course, recitations, Fall 2004).  
 - *Introductory Linear Algebra* (undergraduate course, lectures, Spring 2004).  
 - *Ordinary Differential Equations* (undergraduate course, lectures, Winter 2003 & Spring 2003).  
 - *Ordinary Differential Equations* (undergraduate course, lectures and recitations, Fall 2002).  
 - *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 - **University Paris 11** (Orsay, France)  
 - *Mathematics III* (Chemistry major students) (undergraduate course, recitations, Fall 1997).  
 - *Mathematics II* (Physics and Chemistry major students) (undergraduate course, recitations, Spring 1997).

## LECTURE SERIES

- 2019 - **Tianyuan Mathematical Center in Southwest China** (Sichuan University, Chengdu, China)  
*Laplace-Beltrami Operators and Riemannian Metrics on Noncommutative Tori* (2-hour mini-cours, program on Differential Geometry on Noncommutative Tori, April 25, 2019).  
 - **East China Normal University** (Shanghai, China)  
*Introduction to Noncommutative Geometry* (3-hour lecture, January 2019).
- 2015 - **University of California** (Berkeley, USA)  
*Introduction to Noncommutative Geometry* (five 50-minute lectures, March-April 2015).
- 2012 - **Australian National University** (Canberra, Australia)  
*The Local index formula in noncommutative geometry* (four 1-hour lectures, August 2012).
- 2011 - **Yau Mathematical Science Center** (Tsinghua University, Beijing, China)  
*Introduction to noncommutative geometry* (six 1-hour lectures, October 2011).  
 - **Chulalongkorn University** (Bangkok, Thailand)  
 CIMPA Summer School *Spectral Triples and Applications*  
*Noncommutative geometry and group actions* (six 90-minute lectures, May 23-June 3, 2011).  
 - **University of Western Ontario** (London, ON, Canada)  
*Noncommutative geometry and group actions* (three 1-hour lectures, February 14-15, 2011).
- 2010 - **McGill University** (Montréal, QC, Canada)  
*Fefferman program and Green functions of conformally invariant operators* (five 90-minute lectures, August 2010).  
 - **Ohio State University** (Columbus, OH, USA)  
*The local index formula in noncommutative geometry and applications in transverse geometry* (four 90-minute lectures, March 5-12, 2010).

## TALKS AT INTERNATIONAL CONFERENCES

- 2019 - *Noncommutative Calculus and the Spectral Action*, University of New South Wales, Sydney, Australia, August 5-9, 2019.
- *Workshop on Non-Commutative Geometry and Symplectic Geometry*, Tianyuan Center for Mathematical Sciences, Sichuan University, Chengdu, China, June 23-26, 2019.
  - *K-Theory and Noncommutative Geometry*, Shanghai Center for Mathematical Sciences, Fudan University, Shanghai, China, June 3-6, 2019.
  - *Workshop on Deformation Theory and Homotopy Algebras*, Emeishan, Southwest Jiaotong University, China, May 6-11, 2019.
- 2018 - *Noncommutative Geometry and K-theory at Rits*, Ritsumeikan University, Biwako-Kusatsu, Japan, March 26-28, 2018.
- 2017 - *Winter Meeting of the Canadian Mathematical Society* (special session on cyclic homology and noncommutative geometry), University of Waterloo, Waterloo, Canada, December 9-12, 2017.
- *MCA Satellite Conference on Operator Algebras*, Fields Institute, Toronto, Canada, July 31-August 4, 2017.
  - *Index Theory and Singular Structures*, University of Toulouse, France, May 29-June 2, 2017.
  - *Noncommutative Geometry: Index Theory and its Ramifications in Geometry, Topology and Physics* (in honor of Alain Connes' 70th birthday). Fudan University, Shanghai, China, March 23-27, 2017.
- 2016 - *Noncommutative Index Theory*, Banach Center, IMPAN, Warsaw, Poland, October 24-28, 2016.
- *Cyclic Homology*, Banach Center, IMPAN, Warsaw, Poland, October 17-21, 2016.
  - *Canadian Operator Algebras Symposium (COSy)*, CRM, Montréal, Canada, June 13-17, 2016.
- 2015 - *Winter Meeting of the Canadian Mathematical Society* (geometric spectral theory session), Montréal, Canada, December 4-7, 2015.
- *Noncommutative methods in Topology and Geometry*, University Lyon 1, Lyon, France, June 1-5, 2015.
- 2014 - *West Coast Operator Algebra Seminar (WCOAS)*, University of Denver, USA, November 1-2, 2014.
- *ICM Satellite Conference on Geometric Analysis*, Sungkyunkwan University, Suwon, South Korea, August 22-24, 2014.
  - *International Congress of Mathematicians* (short communication), Seoul, South Korea, August 13-21, 2014.
  - *Canadian Operator Algebras Symposium (COSy)*, Fields Institute, Toronto, Canada, June 23-27, 2014.
  - *Noncommutative Geometry Festival*, Université Texas A & M, College Station, USA, April 30-May 3, 2014.
  - *China-Korea Conference on Several Complex Variables*, Seoul National University, Seoul, South Korea, January 7-10, 2014.



- 2013 - *Further development of Atiyah-Singer index theorem and K-theory*, Kyoto University, Kyoto, Japan, December 16-20, 2013.
- *Australian Mathematical Society Meeting* (Geometric Analysis session), University of Sydney, Sydney, Australia, September 30-October 3, 2013.
  - *Australian Mathematical Society Meeting* (Operator Algebras and Dynamical Systems session), University of Sydney, Sydney, Australia, September 30-October 3, 2013.
  - *Pacific Rim Conference on Mathematics* (Mathematical Physics session), Sapporo, Japan, July 1-5, 2013.
  - *China-Japan Conference on Noncommutative Geometry and K-theory*, Jilin University, Changchun, China, June 9-16, 2013.
- 2012 - *Noncommutative Geometry* (Summer school and conference), Fudan University, Shanghai, China, July 9-28, 2012.
- *Manifolds of Metrics and Probabilistic Methods in Geometry and Analysis*, CRM, Montréal, Canada, July 2-6, 2012.
  - *K-Theory, C\*-algebras and Topology of Manifolds II*, Chern Institute, Nankai University, Tianjin, May 7-11, 2012.
  - *East Asia Mini Workshop on CR Geometry*, Academia Sinica, Taipei, Taiwan, March 24-25, 2012.
- 2011 - *Kansai Operator Algebra Seminar*, Kinoshita, Japan, December 16-17, 2011.
- *Kyoto Symposium on Complex Analysis in Several Variables*, Kyoto University, Kyoto, Japan, July 18-22, 2011.
  - *Spring Institute on Noncommutative Geometry and Operator Algebras*, Vanderbilt University, Nashville, USA, May 9-18, 2011.
- 2010 - *Tambara Workshop on Parabolic Geometries and Related Topics*, Tambara Seminar House, University of Tokyo, Japan, November 2-5, 2010.
- 2009 - *Bimonthly Canadian Noncommutative Geometry Workshop*, Fields Institute, Toronto, Canada, August 14, 2009.
- 2009 - *Hayama Symposium on Complex Analysis in Several Variables*, Hayama, Japan, July 20-23, 2009.
- 2008 - *Complex and CR Geometry, Partial Differential Equations and Invariant Theory* (in honor of J.J. Kohn), Prague, Czech Republic, June 30-July 4, 2008.
- *Motives, Quantum Field Theory and Pseudodifferential Operators*, Boston University, USA, June 1-14, 2008.
  - *Canada-France Congress* (session on K-theory and noncommutative geometry, University of Québec at Montréal (UQÀM), Canada, June 1-6, 2008.
  - *Noncommutative Geometry*, Fields Institute, Toronto, Canada, May 27-31, 2008.
- 2007 - *Winter Meeting of the Canadian Mathematical Society* (noncommutative geometry session), London, ON, Canada, December 8-10, 2007.
- 2006 - *Trends in Noncommutative Geometry* (poster), Newton Institute, Cambridge, UK, December 17-22, 2006.
- *ISAAC Workshop on Pseudo-Differential Operators: Partial Differential Equations and Time-Frequency Analysis*, Fields Institute, Toronto, Canada, December 11-15, 2006.

- *Noncommutative Geometry and Cyclic Cohomology*, Newton Institute, Cambridge, UK, July 31-August 4, 2006.
- 2005 - *Hayama symposium on Several Complex Variables*, Hayama, Japan, December 18-21, 2005.
- *Analytic Geometry of the Bergman Kernel and Related Topics*, RIMS, Kyoto, Japan, December 12-16, 2005.
- *Traces in Geometry, Number Theory and Quantum Fields*, Max Planck Institute for Mathematics, Bonn, Germany, 24-28 October, 2005.
- 2004 - *Noncommutative Geometry, The Local Index Formula and Hopf Algebras*, Fields Institute, Toronto, Canada, September 24-25, 2004.
- *Spring Institute on Noncommutative Geometry and Operator Algebras*, Vanderbilt University, Nashville, USA, May 15-25, 2004.
- *AMS Spring Eastern Section Meeting* (special Session on CR Geometry and Singularities), Lawrenceville, USA, April 17-18, 2004.
- *Asymptotic and Effective Results in Complex Geometry* (in honor of Bernard Shiffman), Johns Hopkins University, Baltimore, USA, March 15-21, 2004.
- 2003 - *Noncommutative Geometry and Number Theory*, Max Planck Institute for Mathematics, Bonn, Germany, August 18-22, 2003.
- *Spring Institute on Noncommutative Geometry and Operator Algebras*, Vanderbilt University, Nashville, USA, May 2-13, 2003.
- *Noncommutative Geometry*, BIRS, Banff, Canada, April 5-10, 2003.
- 2001 - *West Coast Operator Algebra Seminar*, Arizona State University, Tempe, USA, October 13-14, 2001.
- *Geometric Scattering Theory and Elliptic Theory on Singular and Noncompact Spaces*, MSRI, Berkeley, USA, May 7-11, 2001.
- *Spring school on PDEs*, University of Potsdam, Postdam, Germany, February 5-9, 2001.
- 1998 - *International Congress of Mathematicians* (short communication), Berlin, Germany, August 18-27, 1998.

### COLLOQUIA AND SEMINARS<sup>3</sup>

- 2019 - *Topology Seminar*, Australian National University, Canberra, Australia, August 27, 2019.
- *Analysis Seminar*, University of New South Wales, Sydney, Australia, July 24, 2019.
- *Analysis Seminar*, University of Ottawa, Ottawa, Canada, February 2019.
- *Operator Algebras Seminar*, East China Normal University, Shanghai, China, January 2019.
- 2018 - *Operator Algebras Seminar*, University of Victoria, Canada, September 19, 2018.
- *Topology and Geometry Seminar*, University of Québec at Montréal, Canada, February 9, 2018.
- 2017 - *Differential Topology Seminar*, Kyoto University, Kyoto, Japan, October 6, 2017.

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<sup>3</sup>Since 2005 only.

- *Algebra and Geometry Seminar*, Sichuan University, Chengdu, China, April 21, 2017.
- *Darboux Seminar*, University of Montpellier, Montpellier, France, January 13, 2017.
- *Glasgow Analysis Seminar*, University of Glasgow, Glasgow, UK, January 10, 2017.
- 2016 - *Kansai Operator Algebra Seminar*, Kyoto University, Kyoto, Japan, December 13, 2016.
- *Analysis-Geometry Seminar*, Northeastern University, Boston, USA, February 26, 2016.
- 2015 - *Operator Theory Seminar*, University of Toronto, Toronto, Canada, March 20, 2015.
- *Noncommutative Geometry Seminar*, California Institute of Technology, Pasadena, USA, March 11, 2015.
- *Analysis and PDE Seminar*, University of California, Berkeley, USA, March 9, 2015.
- *Geometry and PDE Seminar*, University of Washington, Seattle, USA, February 25, 2015.
- *Theoretical Physics Seminar*, Aix-Marseille University, Marseilles, France, January 9, 2015.
- 2014 - *Analysis and Theoretical Physics Seminar*, Leibniz University, Hannover, Germany, December 9, 2014.
- *Analysis and PDE Seminar*, Stanford University, Palo Alto, USA, December 1, 2014.
- *Quantum Geometry Seminar*, University of California, Berkeley, USA, November 12, 2014.
- *Analysis Seminar*, McGill University, Montréal, Canada, November 10, 2014.
- *Geometry and Topology Seminar*, University of Québec at Montréal (UQÀM), Montréal, Canada, November 7, 2014.
- *Noncommutative Geometry Seminar*, University of Colorado, Boulder, November 4, 2014.
- *Quantum Geometry Seminar*, University of California, Berkeley, USA, October 29, 2014.
- *Geometry Seminar*, Academia Sinica, Taipei, Taiwan, May 9, 2014.
- *Noncommutative Geometry Seminar*, University of Lorraine, Metz, France, February 27, 2014.
- *Complex Analysis and Geometry Seminar*, University of Paris 6, Paris, France, February 25, 2014.
- *Analysis and Dynamics Seminar*, University of Nice, Nice, France, February 11, 2014.
- *Mathematical Physics Seminar*, University of Lyon 1, Lyon, France, February 7, 2014.
- *Geometry Seminar*, University of Lorraine, Nancy, France, February 4, 2014.
- *Darboux Seminar*, University of Montpellier 2, Montpellier, France, January 31, 2014.
- *Geometry Seminar*, University of Nantes, Nantes, France, January 24, 2014.
- *Operator Algebras Seminar*, University of Paris 7, Paris, France, January 23, 2014.
- *Geometric Analysis Seminar*, University of Cologne, Cologne, Germany, January 14, 2014.

- 2013 - *Colloquium*, Seoul National University, South Korea, November 7, 2013.
- *Differential Geometry Seminar* (2 talks), University of Adelaide, Adelaide, Australia, September 16, 2013.
  - *Kyoto Operator Algebras Seminar*, Kyoto University, Kyoto, Japan, July 10, 2013.
  - *Colloquium*, Inha University, Incheon, South Korea, April 3, 2013.
  - *Analysis and PDE Seminar*, Stanford University, Palo Alto, February 14, 2013.
  - *Quantum Geometry Seminar*, University of California, Berkeley, February 7, 2013.
  - *Colloquium*, Washington University, Saint-Louis, USA, January 17, 2013.
  - *Differential Geometry and PDE Seminar*, University of Washington, Seattle, USA, January 9, 2013.
- 2012 - *Mathematics Seminar*, Yau Mathematical Science Center, Tsinghua University, Beijing, China, October 12, 2012.
- *Operator Algebras Seminar*, University of Wollongong, Wollongong, Australia, August 23, 2012.
  - *Analysis Seminar*, Australian National University, Canberra, Australia, August 22, 2012.
  - *Colloquium*, Korean Advanced Institute for Science and Technology (KAIST), Daejeon, South Korea, March 22, 2012.
  - *Mathematics Seminar*, Yau Mathematical Science Center, Tsinghua University, Beijing, China, February 29, 2012.
  - *Geometry and Topology Seminar*, University of Québec at Montréal (UQÀM), Montréal, Canada, February 22, 2012.
- 2011 - *Colloquium*, Seoul National University, South Korea, September 22, 2011.
- *Seminar of Mathematics*, Korean Institute of Advanced Study (KIAS), Seoul, South Korea, August 4, 2011.
  - *Operator Algebras Seminar*, University of Tokyo, Tokyo, Japan, July 14, 2011.
  - *Geometric Complex Analysis Seminar*, University of Tokyo, Tokyo, Japan, July 4, 2011.
  - *Geometry Seminar*, Academia Sinica, Taipei, Taiwan, May 2, 2011.
  - *Geometry Seminar*, Academia Sinica, Taipei, Taiwan, April 29, 2011.
  - *Operator Theory Seminar*, University of Victoria, Victoria, Canada, March 2, 2011.
  - *Differential Geometry, Mathematical Physics and PDE Seminar*, University of British Columbia, Vancouver, Canada, March 1, 2011.
  - *Differential Geometry and Geometric Analysis Seminar*, Princeton University, Princeton, USA, February 11, 2011.
  - *Operator Theory Seminar*, University of Toronto, Toronto, Canada, February 7, 2011.
  - *Operator Algebras Seminar*, University of Tokyo, Tokyo, Japan, January 11, 2011.
- 2010 - *Topology Seminar*, University of Tokyo, Tokyo, Japan, December 7, 2010.
- *Mathematics and String Theory Seminar*, Institute for the Physics and Mathematics of the Universe (IMPU), Tokyo, Japan, October 28, 2010.
  - *Analysis Seminar*, University of Auckland, New-Zealand, October 18, 2010.

- *Functional Analysis Seminar*, Seoul National University, South Korea, September 17, 2010.
- *Colloquium*, Sungkyunkwan University, Suwon, South Korea, September 16, 2010.
- *Mathematics Seminar*, Korean Institute of Advanced Study (KIAS), Seoul, South Korea, September 8, 2010.
- 2009 - *Colloquium*, Academia Sinica, Taipei, Taiwan, November 3, 2009.
- *Operator Algebras Seminar*, University of Tokyo, Tokyo, Japan, May 14, 2009.
- *Analysis Seminar*, McGill University, Montréal, Canada, March 20, 2009.
- *Geometry and Topology Seminar*, Université du Québec à Montréal (UQÀM), Montréal, Canada, February 20, 2009.
- 2007 - *Operator Theory Seminar*, University of Toronto, Canada, March, 2007.
- 2006 - *Analysis Seminar*, Université York, Toronto, Canada, November, 2006.
- *PDE/Applied Mathemics/Analysis Seminar*, University of Toronto, Canada, November, 2006.
- 2005 - *Operator Algebras Seminar*, University of Tokyo, Japan, November, 2005.
- *Geometric Complex Analysis Seminar*, University of Tokyo, Japan, November, 2005.
- *PDE and Geometry Seminar*, University of Wahsington, Seattle, USA, October, 2005.
- *Special Lecture*, University of California, Davis, USA., October, 2005
- *Geometry Seminar*, Stanford University, USA, October, 2005.
- *Symplectic Geometry Seminar*, University of California, Berkeley, USA, September, 2005.
- *Analysis and Geometry Seminar*, Northeastern University, Boston, USA, March, 2005.
- *Geometry Seminar*, Boston University, Boston, USA, March, 2005.
- *Colloquium*, University of California, Riverside, USA, March, 2005.
- *Colloquium*, IUPUI, Indianapolis, USA, February, 2005.
- *Heisenberg Group Seminar*, University of Stony Brook, Stony Brook, USA, February, 2005.
- *Analysis Seminar*, Princeton University, Princeton, USA, February, 2005..

#### SHORT-TERM VISITS

- 2019 - **University of New South Wales** (Sydney, Australia)  
July 1-August 30, 2019. Host: F. Sukochev.
- **East China Normal University** (Shanghai, China)  
January 3-8, 2019. Host: H. Wang.
- 2018 - **Sichuan University** (Chengdu, China)  
December 20, 2018 - January 3, 2019. Host: X. Chen.
- **University of New South Wales** (Sydney, Australia)  
October 1-14 & December 10-20, 2018. Host: F. Sukochev.
- **University of Québec at Montréal (UQÀM)** (Montréal, Canada)  
June 12-August 31, 2018. Host: V. Apostolov.

- 2017 - **Kyoto University** (Kyoto, Japan)  
September 29-October 9, 2017. Host: T. Kato.
- **McGill University** (Montréal, Canada)  
January 23-February 28 & June 9-August 30, & December 12-31, 2017. Host: D. Jakobson.
  - **Paris-Diderot University** (Paris, France)  
January 3-14, 2017. Host: S. Vassout.
- 2016 - **University of Tokyo** (Tokyo, Japan)  
February 29-March 4, 2016. Host: K. Hirachi.
- **McGill University** (Montréal, Canada)  
January 1-February 28, June 2- September 1 & December 14-31, 2016. Host: D. Jakobson.
- 2015 - **University of Adelaide** (Adelaide, Australia)  
October 13-20, 2015. Host: H. Wang.
- **McGill University** (Montréal, Canada)  
June 7-July 4, July 12-August 29 & December 4-31, 2015. Host: D. Jakobson.
- 2015 - **University of Québec at Montréal (UQÀM)** (Montréal, Canada)  
March 20-28, 2015.
- **University of Washington** (Seattle, USA)  
February 23-26, 2015. Host: R. Graham.
- 2014 - **Leibniz University** (Hannover, Germany)  
December 7-10, 2014. Host: E. Schrohe.
- **University of Colorado** (Boulder, CO, USA)  
November 3-5, 2014. Host: A. Gorokhovsky.
  - **Academia Sinica** (Taipei, Taiwan)  
May 5-10. Host: C.Y. Hsiao.
  - **University of Cologne** (Cologne, Germany)  
January 12-15. Host: G. Marinescu.
  - **University Paris 7** (Paris, France)  
January 8-February 28, 2014.
- 2013 - **University of Adelaide** (Adelaide, Australia)  
September 13-20, 2013. Host: H. Wang.
- **Kyoto University** (Kyoto, Japan)  
June 16-28, July 7-26 & December 10-27, 2013. Host: K. Yoshikawa.
  - **Washington University** (St. Louis, USA)  
January 16-19. Host: X. Tang.
  - **University of California** (Berkeley, USA)  
January 15-March 1 & July 28-September 1, 2013. Host: J. Lott.
  - **University of Washington** (Seattle, USA)  
January 9-15. Host: R. Graham.
  - **Shanghai Mathematical Research Center** (Fudan University, Shanghai, China)  
December 29, 2012-January 5, 2013. Host: G. Yu.

- 2012 - **McGill University** (Montréal, Canada)  
January 29-February 26 & June 9-July 20, 2012. Host: D. Jakobson.
- **Yau Mathematical Science Center** (Tsinghua University, Beijing, China)  
February 28-March 5, 2012 & October 11-16, 2012. Host: H. Wang.
  - **University of Tokyo** (Tokyo, Japan)  
January 13-27, 2012 & September 28-October 5, 2012. Host: K. Hirachi.
  - **University Paris 6** (Paris, France)  
January 2-9, 2012. Host: X. Ma.
- 2011 - **Yau Mathematical Science Center** (Tsinghua University, Beijing, China)  
October 22-30, 2011. Host: H. Wang.
- **Academia Sinica** (Taipei, Taiwan)  
April 27-May 5. Host: J.H. Cheng.
  - **McGill University** (Montréal, Canada)  
January 15-February 26, 2011. Host: D. Jakobson.
  - **École Normale Supérieure** (Paris, France)  
January 3-5. Host: C. Guillarmou.
- 2010 - **École Normale Supérieure** (Paris, France)  
December 19-24. Host: C. Guillarmou.
- **Korean Institute of Advanced Study (KIAS)** (Seoul, South Korea)  
September 5-21. Host: J. Park.
  - **McGill University** (Montréal, QC, Canada)  
July 16-September 2, 2010. Host: D. Jakobson.
  - **University of California** (Berkeley, USA)  
April 27-May 8, 2010. Host: J. Lott.
- 2009 - **Academia Sinica** (Taipei, Taiwan)  
October 30-November 5. Host: P. Greiner.
- **University of Toronto** (Toronto, Canada)  
August 14-September 1, 2009.
  - **University of Québec at Montréal (UQÀM)** (Montréal, Canada)  
February 11-22 & September 10-October 3, 2009. Host: V. Aspotolov.
- 2008 - **McGill University** (Montréal, Canada)  
May 3-June 30, 2008. Host: D. Jakobson.
- **Boston University** (Boston, USA)  
April 14 - Mai 1, 2008. Host: S. Rosenberg.
  - **Columbia University** (New York City, USA)  
February 15-26, 2008. Host: C. Fefferman.
- 2007 - **University of California** (Berkeley, USA)  
May 3-July 31, 2007. Host: A. Weinstein.
- 2005 - **Harvard University** (Cambridge, USA)  
February 28-March 26, 2005. Host: Y.T. Siu.
- 2004 - **University of Adelaide** (Adélaïde, Australia)  
July 8-August 6, 2004. Host: M. Varghese.

## EVENTS ORGANIZATION

- 2019 - **Tianyuan Mathematical Center, Sichuan University** (Chengdu, China)  
Program on *Differential Geometry on Noncommutative Tori*, April 15-May 25, 2019.  
Co-organized with B. Chen, X. Chen, and W. Hu.
- 2018 - **Tianyuan Mathematical Center, Sichuan University** (Chengdu, China)  
Workshop *Noncommutative Geometry and Representation Theory*, May 14-18, 2018.  
Co-organized with X. Chen, F. Eshmatov, and W. Hu.
- 2017 - **McGill University** (Montréal, Canada)  
Special session *Noncommutative Geometry and Quantification*, Mathematical Congress of the Americas, July 24-28, 2017.  
Co-organized with P. Bressler (Bogotá, Colombia), B. Rangipour (New Brunswick), Z. Xie (Texas A&M).
- 2015 - **University of Québec at Montréal (UQÀM)** (Montréal, Canada)  
Workshop *Noncommutative Geometry and Spectral Invariants* (in honor of G. Skandalis), June 29-July 3, 2015.  
Co-organized with G. Elliott (Toronto), T. Giordano (Ottawa), M. Khalkhali (Western), V. Nistor (Metz, France) & F. Rochon (UQÀM).
- 2008 - **University of British Columbia** (Vancouver, Canada)  
AMS Fall Western Section Meeting, special session on noncommutative geometry, October 4-5, 2008. Co-organized with H. Emerson (Victoria) & B. Rangipour (New Brunswick).

## DEPARTMENTAL SERVICE

- 2012-2018 - **Seoul National University** (Seoul, South Korea)  
Communications Committee of the Department of Mathematical Sciences (2016–).  
Graduate Committee of the Department of Mathematical Sciences (2017–2018).  
Undergraduate Committee of the Department of Mathematical Sciences (2012-2016).
- 2002-2004 - **Ohio State University** (Columbus, OH, USA)  
Co-organizer of the Geometric Analysis seminar.
- 1998-2000 - **Ecole Normale Supérieure** (Lyon, France)  
Co-organizer of the seminar of Pure Mathematics (1999-2000).  
Co-organizer of the internal seminar of the Math Department (1998-1999).

## PEER-REVIEWED ACTIVITIES

- Referee for *Advances in Mathematics*, *Annals of Mathematics*, *Asian Journal of Mathematics*, *Central European Journal of Mathematics*, *Communications in Analysis and Geometry*, *Communications in Mathematical Physics*, *Communications in Partial Differential Equations*, *Forum Mathematicum*, *Frontiers of Mathematics in China*, *Indagationes Mathematicae*, *Indiana University Mathematics Journal*, *International Journal of Geometric Methods in Modern Physics*, *International Journal of Mathematics*, *Inventiones Mathematicae*, *Journal d'Analyse Mathématique*, *Journal für die Reine und Angewandte Mathematik* (Crelle's Journal), *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, Letters in Mathematical Physics, Mathematische Zeitschrift, Pacific Journal of Mathematics, SIGMA (Symmetry, Integrability and Geometry: Methods and Applications), and Transactions of the AMS.*