

# Jean-Michel Bismut

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Born: February 26, 1948—Lisbon, Portugal  
Nationality: French

## Current position

*Emeritus Professor*, Institut de Mathématique d'Orsay

## Areas of specialisation

Probability theory, Geometric analysis, Index theory, complex geometry.

## Appointments held

1973-1976	Ingénieur du Corps des Mines at Marseille.
1976–	Institut de Mathématique d'Orsay, Université Paris-Saclay
1984	Member, I.A.S. (Princeton)
1987-1988	Visitor at I.H.E.S. (Bures-sur-Yvette)
1992-2002	Professor at Institut Universitaire de France
1994	Member, I.A.S. (Princeton)
2007	Visiting Professor at Courant Institute
2012-2017	E.R.C. Advanced Grant: The analysis of the Dirac operator: The hypoelliptic Laplacian and its applications

## Education

1970	Graduate École Polytechnique Paris
1973	Graduate École Nationale Supérieure des Mines de Paris
1973	PhD in Mathematics, Université Paris VI

## Grants, honours & awards

- 1990 Ampère prize of the Académie des Sciences  
1991 Member Académie des Sciences  
1998 Member Academia Europaea  
1998 Plenary speaker at International Congress of Mathematics (Berlin)  
2004 Member Deutsche Akademie Leopoldina  
2021 International Member of the National Academy of Sciences  
2021 Shaw Prize in Mathematics (shared with Jeff Cheeger)

## Publications & talks

### SELECTED JOURNAL ARTICLES

- 1973 J.-M. Bismut. Conjugate convex functions in optimal stochastic control. *J. Math. Anal. Appl.*, 44:384–404, 1973.  
1975 J.-M. Bismut. Growth and optimal intertemporal allocation of risks. *J. Econom. Theory*, 10(2):239–257, 1975.  
1981 J.-M. Bismut. Martingales, the Malliavin calculus and hypoellipticity under general Hörmander’s conditions. *Z. Wahrsch. Verw. Gebiete*, 56(4):469–505, 1981.  
1986 J.-M. Bismut. The Atiyah-Singer index theorem for families of Dirac operators: two heat equation proofs. *Invent. Math.*, 83(1):91–151, 1986.  
1988 J.-M. Bismut, H. Gillet, and C. Soulé. Analytic torsion and holomorphic determinant bundles. III. Quillen metrics on holomorphic determinants. *Comm. Math. Phys.*, 115(2):301–351, 1988.  
1989 J.-M. Bismut and J. Cheeger.  $\eta$ -invariants and their adiabatic limits. *J. Amer. Math. Soc.*, 2(1):33–70, 1989.  
1990 J.-M. Bismut. Koszul complexes, harmonic oscillators, and the Todd class. *J. Amer. Math. Soc.*, 3(1):159–256, 1990. With an appendix by the author and C. Soulé.  
1992 J.-M. Bismut and G. Lebeau. Complex immersions and Quillen metrics. *Inst. Hautes Études Sci. Publ. Math.*, (74):ii+298 pp. (1992), 1991.  
1992 J.-M. Bismut and W. Zhang. An extension of a theorem by Cheeger and Müller. *Astérisque*, (205):235, 1992. With an appendix by François Laudenbach.  
1995 J.-M. Bismut and J. Lott. Flat vector bundles, direct images and higher real analytic torsion. *J. Amer. Math. Soc.*, 8(2):291–363, 1995.  
2005 J.-M. Bismut. The hypoelliptic Laplacian on the cotangent bundle. *J. Amer. Math. Soc.*, 18(2):379–476 (electronic), 2005.  
2019 J.-M. Bismut. Eta invariants and the hypoelliptic Laplacian. *J. Eur. Math. Society*, 21(8):2355–2515, 2019.  
2021 J.-M. Bismut, S. Shen, and Z. Wei. Coherent sheaves, superconnections, and RRG. *arXiv e-prints*, 2021.  
2022 J.-M. Bismut and S. Shen. Geometric orbital integrals and the center of the enveloping algebra. *Compositio Mathematica*, 158(6):1189–1253, 2022.

## BOOKS

- 1981 J.-M. Bismut. *Mécanique aléatoire*, volume 866 of *Lecture Notes in Mathematics*. Springer-Verlag, Berlin, 1981. With an English summary.
- 1984 J.-M. Bismut. *Large deviations and the Malliavin calculus*, volume 45 of *Progress in Mathematics*. Birkhäuser Boston Inc., Boston, MA, 1984.
- 2008 J.-M. Bismut and G. Lebeau. *The hypoelliptic Laplacian and Ray-Singer metrics*, volume 167 of *Annals of Mathematics Studies*. Princeton University Press, Princeton, NJ, 2008.
- 2011 J.-M. Bismut. *Hypoelliptic Laplacian and orbital integrals*, volume 177 of *Annals of Mathematics Studies*. Princeton University Press, Princeton, NJ, 2011.
- 2013 J.-M. Bismut. *Hypoelliptic Laplacian and Bott-Chern cohomology*, volume 305 of *Progress in Mathematics*. Birkhäuser/Springer, Cham, 2013.
- 2023 J.-M. Bismut, S. Shen, and Z. Wei. *Coherent sheaves, superconnections, and Riemann-Roch-Grothendieck*, volume 347 in *Progress in Mathematics*. Birkhäuser/Springer, Cham, 2023.

## Service to the profession

- 1988-2000 Editor Duke Math. Journal
- 1996-2008 Managing Editor of *Inventiones Mathematicae* (with G. Faltings)
- 2000-2006 Chairman of Fachbeirat of the Max-Planck Institut für Mathematik (Bonn)
- 1990-1998 Member of the Scientific Committee of the Isaac Newton Institute (Cambridge UK)
- 1998-2002 Member of the Executive Committee of International Mathematical Union (IMU)
- 2002-2006 Vice-president of International Mathematical Union (IMU)