

# Curriculum Vitae et Studiorum

Matilde Marcolli

**Born:** 30/11/1969, Como, Italy.

**Citizenship:** Italian

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## Education

- June, 1997: Ph.D. Mathematics, The University of Chicago. Dissertation: *Three-dimensional aspects of Seiberg-Witten gauge theory*; Thesis advisor: Prof. Mel Rothenberg.
- December, 1994: Master Sc., Mathematics, The University of Chicago.
- June, 1993: *Laurea* in Physics, 110/110 summa cum laude, Università degli Studi, Milano Italy. Dissertation: *Classes of self equivalences of fibre bundles*; Thesis advisor: Professor R. A. Piccinini (Department of Mathematics).
- June 1988: *Maturità classica* 60/60, Liceo Classico A. Volta, Como Italy.

## Employment History

- **2000-2005:** Associate Professor (C3), Max Planck Institut für Mathematik, Bonn, Germany.
- **2001-:** Associate Professor (courtesy appointment), Mathematics Department, Florida State University, USA
- **1997-2000:** C.L.E. Moore Instructor, Department of Mathematics, Massachusetts Institute of Technology, USA.

## Awards, Grants, Visiting Positions

- **2001–2004:** Alexander von Humboldt Foundation grant: “Sofja Kovalevskaya Award”.

- **2001:** Heinz–Maier–Leibnitz–Preis of the Deutsche Forschungsgemeinschaft.
- **1998-2000:** National Science Foundation grant DMS-9802480.
- **May-June 1999:** visiting position at the Max Planck Institut für Mathematik, Bonn, Germany.
- **January 1999:** visiting position at the Tata Institute of Fundamental Research, Mumbai, India.
- **June-August 1998:** visiting position at the Max Planck Institut für Mathematik, Bonn, Germany.
- **August 1998:** NSF ICM travel grant awarded to attend International Congress of Mathematics in Berlin, August 1998.
- **July 1997:** NSF ICMP travel grant awarded to attend International Congress of Mathematical Physics, Canberra, Australia.
- **July 1996:** Guest of the program “Research in Pairs” (for collaborative research with M. Spreafico) at the Mathematisches Forschungsinstitut Oberwolfach, Germany.
- **1995-1997:** *Borsa di Studio e Ricerca*, Research Grant from CNR (National Council of Research of Italy).

## Publications and Preprints

### Books

1. “Seiberg-Witten Gauge Theory”, *Texts and Readings in Mathematics*, Vol. 17, Hindustan Book Agency, 1999.

### Articles

1. (with Yuri I. Manin) *Continued fractions, modular symbols, and non-commutative geometry*, to appear in *Selecta Mathematica*
2. (with Bai-Ling Wang) *Seiberg–Witten invariant and Casson-Walker invariant for rational homology spheres* to appear in *Geometriae Dedicata*

3. (with Bai-Ling Wang) *Equivariant Seiberg-Witten Floer Homology*, Communications in Analysis and Geometry, 9 (2001) 3, 450–640.
4. (with Varghese Mathai) *Twisted higher index theory on good orbifolds, Part II: fractional quantum numbers*, Communications in Mathematical Physics 217 (2001) 1, 55–87.
5. (with Varghese Mathai) *Twisted index theory on good orbifolds, I: non-commutative Bloch theory*, Communications in Contemporary Mathematics, Vol.1 N.4 (1999) 553-587.
6. *Seiberg-Witten Floer homology and Heegaard splittings*, International Journal of Mathematics, Vol. 7, No. 5 (1996) 671-696.
7. (With M. Spreafico), *Gauge groups and characteristic classes*, Expositiones Mathematicae. 15 (1997) 229-249.
8. *Some remarks on conjugacy classes of bundle gauge groups*, Cahiers de Topologie et Géométrie Différentielle Catégoriques, 37, No. 1 (1996) 21-39.
9. *Lorenz bundles*, Proceedings of the Eleventh International Conference of Topology, (Trieste 1993), *Rendiconti dell'Instituto di Matematica dell'Università di Trieste*, Vol. 25, No. 1-2 (199) 309-315.

## Preprints

1. *Limiting modular symbols and the Lyapunov spectrum*, preprint 26 pages.
2. Система Обыкновенных Дифференциальных Уравнений Антисамодвойственных Связностей и Монополей Дирака, preprint 7 pages

## Work currently under revision

1. (with Alan Carey and Bai-Ling Wang) *Exact triangles in Seiberg-Witten-Floer theory, Part I: the geometric triangle*, preprint 83 pages (available as preprint math.DG/9907065)

2. (with Bai-Ling Wang) *Exact triangles in Seiberg-Witten-Floer theory, Part II: geometric limits of flow lines*, preprint 71 pages (available as preprint math.DG/9907080)
3. (with Bai-Ling Wang) *Exact triangles in Seiberg-Witten-Floer theory, Part III: the proof of exactness*, preprint 69 pages (available as preprint math.DG/0009157).
4. (with Bai-Ling Wang) *Exact triangles in Seiberg-Witten Floer theory. Part IV: Z-graded monopole homology*, preprint 34 pages (available as MPI preprint Series 2000 (84))

## Mathematical Activities

### Invited Talks

- November 2001: Number Theory Seminar, MPIM Bonn, Germany.
- November 2001: Algebraic Geometry seminar, University of Toronto, Canada.
- November 2001: Colloquium Lecture, Regensburg University, Germany.
- October 2001: University of Helsinki, Finland.
- October 2001: Seminar on Algebra, Geometry and Physics, MPIM Bonn, Germany.
- August 2001: Invited speaker at the workshop "Topology of manifolds and group actions", CRM Montreal, Canada.
- May 2001: Scuola Normale Superiore, Pisa, Italy.
- May 2001: Colloquium Lecture, Bielefeld University, Germany.
- May 2001: Colloquium Lecture, Bonn University, Germany.
- March 2001: Invited speaker at the conference "Geometric Analysis and Index Theory", ICTP Trieste, Italy.
- February 2001: Colloquium Lecture, Göttingen University, Germany.

- January 2001: Differential Geometry Seminar, Bonn University, Germany.
- November 2000: Topology seminar, Trinity College, Dublin, Ireland.
- November 2000: Invited speaker at the conference “Perspectives in geometry”, Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany.
- August 2000: Seminar on Algebra, Geometry and Physics, MPIM Bonn, Germany.
- June 2000: Invited speaker at the EURESCO conference “Mathematical Analysis”, Castelvecchio Pascoli, Italy.
- May 2000: Invited speaker at the conference “Perspectives in gauge theory and calibrated geometry”, Martina Franca, Italy.
- February 2000: Gauge Theory Seminar, Harvard University, USA.
- November 1999: Mathematical Physics Seminar, Harvard University/MIT, USA.
- October 1999: Topology seminar, Yale University, USA.
- October 1999: Geometry seminar, University of Illinois at Urbana Champaign, USA.
- October 1999: Sectional meeting AMS, Special Session “Gauge Theory”, Charlotte NC, USA.
- October 1999: Sectional meeting AMS, Special Session “Index theory”, Austin, USA.
- August 1999: Opening Lecture at the Conference “Geometric properties of real and complex manifolds”, Palermo, Italy.
- June 1999: Oberseminar Topologie, Max Planck Institut für Mathematik, Bonn, Germany.
- March 1999: Geometry Seminar, Florida State University, USA.
- January 1999: Tata Institute of Fundamental Research, Mumbai, India.

- July 1998: Oberseminar Topologie, Max Planck Institut für Mathematik, Bonn, Germany.
- January 1998: Stanford University, USA.
- December 1997: Joint Meeting of the Mexican Mathematical Society and of the American Mathematical Society, Oaxaca, Mexico.
- November 1997: Ohio State University, USA.
- July 1997: Workshop in Geometry and Physics, University of Adelaide, Australia.
- April 1997: University of Adelaide, Australia.
- January 1997: Workshop on 4-dimensional manifolds, MSRI, USA.
- May 1996: Stanford University, USA.
- December 1995: University of Bielefeld, Germany.
- September 1993: International Conference of Topology, Trieste Italy.
- May 1992: Workshop on Measure Theory and Real Analysis, Grado Italy.

## **Service and Teaching**

- Member of the “Chemisch–Physikalisch–Technische Sektion” of the Max–Planck–Gesellschaft.
- Committee work: Scientific Committee of the MPI, Scientific Committee of the EPDI European Postdoctoral Fellowship.
- Served as referee for the following journals: Communications in Analysis and Geometry, Pacific Journal of Mathematics, Topology, Topology and its Applications.
- Served as referee for: NSF grant proposals, under the programs Geometric Analysis, Topology; Minerva Stiftung grant proposals Junior Research Group.

- Reviewer for the Mathematical Reviews and the Zentralblatt
- Taught courses in the following subjects: Analysis on manifolds (MIT), Calculus (University of Chicago), Introduction to Topology (MIT), Morse theory and Floer theory (MIT), Differential Geometry (MIT), Riemann Surfaces (MIT).
- Served as teaching assistant in the following subjects: Calculus (MIT), Complex variables (University of Chicago), Differential Equations (MIT and University of Chicago), Projective geometry (University of Chicago), Real Analysis (Università degli Studi di Milano).
- Seminars organized: Quantum Field Theory (University of Chicago), Gauge Theory Seminar (Max-Planck-Institut, Bonn).

### **Some Conferences and Meetings attended**

- 2001: Geometric analysis and index theory, ICTP, Italy; Symplectic topology, geometry, and gauge theory, Fields Institute Toronto, Canada; 4-manifolds, Oberwolfach; Topology of manifolds and group actions, CRM Montreal, Canada; Current Geometry, Napoli, Italy; DMV Seminar on Non-commutative Geometry, Oberwolfach, Germany.
- 2000: Perspectives in gauge theory and calibrated geometry, Martina Franca, Italy; Mathematical Analysis, Castelvecchio, Italy; AMS Meeting, Washington DC, USA; Geometry Fest, University of Maryland, USA; Trends in non-commutative algebra and geometry, MPIM Bonn, Germany; Perspectives in geometry, MPI-MIS Leipzig Germany.
- 1999: Workshop in Symplectic Topology, Cortona Italy; Conference on Geometric properties of real and complex manifolds, Palermo, Italy; AMS Sectional meeting, Austin USA; AMS Sectional meeting, Charlotte NC USA.
- 1998: International Congress of Mathematicians, Berlin Germany; String theory conference, Harvard USA.
- 1997: Joint Meeting of the SMM and of the AMS, Oaxaca Mexico; Workshop in Geometry and Physics, Adelaide Australia; International Congress of Mathematical Physics, Brisbane Australia; Workshop on 4-dimensional manifolds, MSRI USA.

- 1995: National meeting AMS, San Francisco, USA; Summer school on knot theory, Banach Center, Warsaw Poland; Summer school on cyclic homology and K-theory, Trento Italy, Conference on homotopy theory, Gargnano Italy.
- 1994: Summer school of differential geometry, Cortona Italy; Summer school of homotopy theory, Warsaw Poland; Workshop on quaternionic structures in mathematics and physics, ICTP Trieste, Italy;
- 1993: Workshop of measure theory and real analysis, Grado Italy; Conference of Real Analysis, Capri Italy; Summer school of mathematics, Perugia Italy; Functional analysis and its applications, Gargnano Italy; International conference of Topology, Trieste Italy.
- 1991-92: Workshop of measure theory and real analysis, Grado Italy; Summer school of mathematics, Perugia Italy.