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## Curriculum Vitae: **Barbara NELLI**

**(Professore Associato)**

L'Aquila

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### Education

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- **PhD in Mathematics:** 1995, June, University of Paris VII .  
Thesis: Constant curvature hypersurfaces in hyperbolic space.  
Advisor: Professor Harold Rosenberg.  
Mention: Très honorable.
- **Dottorato di Ricerca in Matematica:** 1995, October, University of Pisa.
- **Laurea (BS) in Mathematics:** 1990, June, University of Pisa.  
Thesis: Superfici Minimali in  $\mathbb{R}^3$ .  
Advisor: Professor Riccardo Benedetti.  
Mark: 110/110 e lode.
- **Diploma Liceo Scientifico:** 1985 Liceo Scientifico U. Dini, Pisa.  
Mark: 60/60.

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## Academic Employment

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- **2005, March - Today.** Professore Associato, Facoltà di SMFN, Università di L'Aquila.
- **1997, December - 2005, February.** Ricercatore, Facoltà di SMFN, Università di L'Aquila.
- **1995, November - 1997, February.** ATER (attaché temporaire de recherche et enseignement) at Université Paris VII.

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## Fellowships and research positions, Qualifications

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- **2004, Mai - July.** Poste Rouge CNRS: position at Université Paris VII, Paris.
- **1999, January - 2000, February.** Post-doctorate fellowship of Humboldt foundation at Technische Universität Berlin.
- **1996 - 1997.** Qualification for the position of Maitre de Conference (France).
- **1996 - 1997.** Post-doctorate fellowship of Università di Pisa.
- **1992 April - June.** ERASMUS fellowship at Université Paris VI.
- **1990, November - 1994, October.** Doctorate in mathematics fellowship of Università di Pisa (research made alternately at University of Pisa and PARIS VII).

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## Last visiting Positions

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- 2012 September: Universidad Granada (invited professor at Departamento de Geometria y Topologia, one weeks)
- 2012 March: PUC Rio de Janeiro (invited professor at PUC, three weeks)
- 2011 June: PUC Rio de Janeiro (invited professor at PUC, two weeks)
- 2011 March-Mai: Université Tours (invited professor by CNRS, three months)
- 2010 September: PUC Rio de Janeiro (invited professor at PUC two weeks)
- 2010 June: Université Paris VII (invited professor by CNRS, one month)
- 2009 October: Université Tours (invited professor by CNRS, one month).
- 2009 August: PUC Rio de Janeiro (invited professor at PUC, one month).

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## Recent Organizations and responsibilities

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- Organization of COLLOQUIUM di MATEMATICA (2009-today) at the University of L'Aquila.
- Scientific and Organizing committee of NTDG 2011 (L'Aquila, 7-9 September 2011): <http://www.sci.unich.it/~parton/NTDG/>
- Scientific and Organizing committee of RAGTS 2008 (Roma, 28-30 May 2008): <http://www.dm.unibo.it/~senni/Roma>
- In charge of the local scientific responsibility of PRIN 2007, L'Aquila unity.
- In charge of the local ATEN funding of Geometry Group of L'Aquila.
- In charge of the responsibility of the 1 year ASSEGNO DI RICERCA for Post-doc at University of L'Aquila (2012), on the following subject: Varietá differenziabili con strutture speciali.

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## Work as Referee of Articles and Thesis

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- **Referee for the following journals:** Annals of Global Analysis and Geometry, Bulletin of the Brazilian Mathematical Society, Commentarii Mathematici Helvetici, Communications in Partial Differential Equations, Differential Geometry and its Applications, Duke Mathematical Journal, Indiana University Mathematical Journal, Journal of Geometrical Analysis, Matematica Contemporanea, Transactions of American Mathematical Society, American Journal of Mathematics, Mediterranean Journal of Mathematics, Pacific Journal of Mathematics, Mathematische Zeitschrift, Journal of Geometry, Rendiconti del Circolo Matematico di Palermo.
- **Referee for the following PhD thesis:**
  - J. M. Espinar, University of Granada, 2008: Codazzi equations on surfaces.
  - F. Torralbo, University of Granada, 2010: Superficies de curvatura media paralela en  $S^2 \times S^2$  y  $H^2 \times H^2$  y superficies de curvatura media constante en espacios homogeneos.
  - S. Cartier, Université Paris-Est, Marne la Vallée, 2011: Surfaces des espace homogénes de dimension 3 (also participation in the Jury).
  - M. A. Jimenéz Grande, University of Granada, 2012: Ecuaciones elipticas con singularidades aisladas y superficies de curvatura constante (also participation in the Jury).
  - J. M. Manzano Prego, University of Granada, 2012: Superficies de curvatura media constante en espacios homogeneos.

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## Research Interests

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### Topology and geometry of hypersurfaces of constant curvature in Riemannian manifolds.

- **Principal problems in the past.** Symmetries of hypersurfaces inherited from symmetries of the boundary; isolated singularities of hypersurfaces; existence and uniqueness of soap bubbles (i.e. constant mean curvature hypersurfaces) in  $\mathbb{H}^{n+1}$ ; mean curvature one surfaces in  $\mathbb{H}^3$ ; minimal surfaces in  $\mathbb{R}^3$  with convex boundary; hypersurfaces with positive constant  $r^{\text{th}}$  symmetric function of the principal curvatures; Bernstein type theorems and *a priori*  $C^2$  estimates for solutions of scalar curvature type PDE.
- **Current interests and work in progress.** Minimal and constant mean curvature surfaces in  $\mathbb{H}^2 \times \mathbb{R}$ . Bernstein type theorems for stable minimal hypersurfaces in  $\mathbb{R}^{n+1}$ ,  $n \leq 7$ ; Caccioppoli's inequality on cmc hypersurfaces in Riemannian Manifolds; Relation between the volume and the entropy of non compact constant mean curvature hypersurfaces in Riemannian manifolds; Schoen type theorems for minimal surfaces in  $\mathbb{H}^2 \times \mathbb{R}$ ; Serrin's problem in product spaces; index bounds for constant mean curvature surfaces in product spaces.

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## Publications and Preprints

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1. S. Ilias, B. Nelli, M. Soret: *On the entropy of stable constant mean curvature hypersurfaces*, **Preprint**.
2. B. Nelli, R. Sa Earp, E Toubiana: *Maximum principle in a half-space for minimal hypersurfaces in  $\mathbb{H}^n \times \mathbb{R}$* , **Preprint**.
3. L. Hauswirth, B. Nelli, R. Sa Earp, E Toubiana: *Minimal ends in  $\mathbb{H}^2 \times \mathbb{R}$  with finite total curvature and a Schoen type theorem*, **arXiv:1111.0851v1 [math.DG]**.
4. S. Ilias, B. Nelli, M. Soret: *Caccioppoli's inequalities for cmc-hypersurfaces in Riemannian Manifolds*, **accepted by Ann. of Global Analysis and Geom. arXiv:1107.3653v1 [math.DG]**
5. M.F. Elbert, B. Nelli, R. Sa Earp: *Vertical Ends of CMC surfaces in  $\mathbb{H}^2 \times \mathbb{R}$* , Trans. Amer. Math. Soc. 364 (2012).
6. B. Nelli, R. Sa Earp: *A halfspace theorem for mean curvature  $H = \frac{1}{2}$  surfaces in  $\mathbb{H}^2 \times \mathbb{R}$* , **J. of Math. Anal. and App.** 365 (2010).
7. B. Nelli: *On properties of constant mean curvature surfaces in  $\mathbb{H}^2 \times \mathbb{R}$* , **Seminari di geometria 2005-2008, Bologna** (2009).

8. B. Nelli: *A Survey on Alexandrov-Bernstein-Hopf Theorems* **Matematica Contemporanea** vol. 35 (2008).
9. B. Nelli, R. Sa Earp, W. Santos, E. Toubiana *Uniqueness of  $H$ -surfaces in  $H^2 \times \mathbb{R}$ ,  $|H| \leq 1/2$ , with boundary one or two parallel horizontal circles*, **Ann. of Global Anal. and Geom.** 33 (4)(2008).
10. B. Nelli, H. Rosenberg: *Errata Minimal Surfaces in  $H^2 \times \mathbb{R}$* , [Bull. Braz. Math. Soc., New Series 33 (2002), 263-292] **Bull. Braz. Math. Soc.**, New Series 38(4) (2007), 1-4.
11. M.F. Elbert, B. Nelli, H. Rosenberg: *Stable Constant Mean Curvature Hypercurves*, **Proc. of the American Math. Soc.** 135, 10 (2007).
12. B. Nelli, M. Soret: *Stably Embedded Minimal Hypersurfaces*, **Math. Zeit.** 255 (2007)
13. B. Nelli, H. Rosenberg: *Simply Connected Constant Mean Curvature Surfaces in  $H^2 \times \mathbb{R}$* , **Michigan Journal of Mathematics** 54, 3 (2006).
14. B. Nelli, H. Rosenberg: *Global Properties of Constant Mean Curvature Surfaces in  $H^2 \times \mathbb{R}$* , **Pacific Journ. Math.** 226, No 1 (2006).
15. B. Nelli, M. Soret: *The State of the Art of Bernstein's Problem*, **Matematica Contemporanea** vol. 29 (2005).
16. B. Nelli, H. Rosenberg: *Minimal Surfaces in  $H^2 \times \mathbb{R}$* , **Bull. Bras. Math. Soc.** (33), 2, (2002), special issue for 50th of IMPA.
17. B. Nelli, M. Soret: *Stably Embedded Minimal Hypersurfaces*, **Trends in Mathematics**, Proceedings of Daewoo Workshops in Pure Mathematics, (5), 2, (2002).
18. B. Nelli, B. Semmler: *On Hypersurfaces embedded in Euclidean Space with Positive Constant  $H_r$  Curvature*, **Indiana Univ. Math. Jour.** [50, (2), (2001)].
19. B. Nelli: *On the structure of Scalar Curvature Type Graphs*, **It. Jour. of Pure and App. Math.** (2001)
20. B. Nelli, B. Semmler: *Some Remarks on  $H$ -Surfaces in a halfspace of  $H^n$* , **Jour. of Geom.** [(64), 1999].
21. B. Nelli: *An Example of an Immersed Complete Genus One Minimal Surface in  $\mathbb{R}^3$  with Two Convex Ends*, on **Comm. Mat. Helv.** [ 73, (3), (1998) ].
22. M.E. Galvão, C. Góes, B. Nelli: *A Weierstrass Type Representation for Surfaces in Hyperbolic Space with Mean Curvature One*, **An. Acad. Bra. Ci.** [ 70, (1),(1998)].
23. Nelli, H. Rosenberg: *Some Remarks on Positive Scalar and Gauss Kronecker Curvature Hypersurfaces of  $\mathbb{R}^{n+1}$  and  $H^{n+1}$* , **Ann. de l'Inst. Fourier** [(47), 4, 1997].

24. B. Nelli, J. Spruck: *On The Existence and Uniqueness of Constant Mean Curvature Hypersurfaces in Hyperbolic Space*, **Geometric analysis and the calculus of variations**, 253–266, Internat. Press, Cambridge, 1996.
25. B. Nelli, H. Rosenberg: *Some remarks on embedded hypersurfaces in hyperbolic space of constant mean curvature and spherical boundary*, **Ann. of Glob. Anal. and Geom.** [ (13), 1995]
26. B. Nelli, R. Sa Earp: *Some Properties of surfaces of prescribed mean curvature in  $H^{n+1}$* , **Bull. Soc. Math. de France** [n.6, 1996].
27. B. Nelli: *Polyhedral surfaces in  $R^3$  with minimality conditions*, **BUMI** [ (7), 9-B, 1995].

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#### Last Talks

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1. July 2011. **International School in Differential Geometry - Universidad de Manaus.** *Minimal Surfaces with two ends in  $H^2 \times R$ .*
2. December 2011. **Universidad Granada: Jornada de Geometria.** *Minimal Surfaces with two ends in  $H^2 \times R$ .*
3. Mai 2011. **Université Paris VII.** *On Caccioppoli's inequalities on CMC hypersurfaces in Riemannian manifolds.*
4. September 2010. **PUC Rio de Janeiro.** *On the index of CMC surfaces in three dimensional manifolds.*
5. June 2010. **Université Paris VII.** *Sur l'indice des surfaces CMC dans les variétés de dimension 3.*
6. October 2009. **Université Tours.** *A survey on Bernstein type Theorems.*
7. August 2009. **Winter School on non linear analysis, UFRJ Brasil.** *Existence of non compact graphs with constant mean curvature in  $H^2 \times R$ .*
8. February 2009. **University of Warwick.** *Vertical Ends of CMC surfaces in  $H^2 \times R$ .*
9. October 2008. **Seminario Coftn, Politecnico di Torino.** *Global Properties of CMC surfaces in  $H^2 \times R$ .*
10. February 2008. **Geometry in Granada.** *Vertical Ends of CMC surfaces in  $H^2 \times R$ .*
11. December 2007. **Seminario di Parma.** *Fini Verticali di curvatura costante in  $H^2 \times R$ .*
12. November 2007. **Seminario di Bologna.** *Esistenza di grafici esterni in  $H^2 \times R$ .*
13. August 2007. **International Conference on Minimal and Constant Mean Curvature Surfaces (IMPA Rio de Janeiro).** *Vertical Ends of Constant Mean Curvature  $H = \frac{1}{2}$  in  $H^2 \times R$ .*

14. February 2007. **Université Paris VII.** *Propriétés Globales de Surfaces de Courbure Moyenne Constante dans les variétés de dimension 3.*

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Teaching at **Università di L'Aquila**

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1. Analisi 1 for Mathematics (1998).
2. Geometria 1 for Mathematics (2000,2001).
3. Algebra for Mathematics (2000).
4. Geometria for Physics (2000, 2001, 2005, 2006, 2007, 2009, 2010, 2011),
5. Matematica Discreta for computer Science (2002, 2003, 2004).
6. Istituzioni di Matematica for Biological Science (2002, 2003, 2004, 2005, 2006, 2007).
7. Topology for Mathematics (2005, 2006).
8. Geometria 3 for Mathematics (2008, 2009, 2010, 2011).

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Teaching at **Università Roma Tor Vergata**

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1. Analisi 2 for engineering (2002, 2003, 2009).

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Teaching at **Università Roma La Sapienza**

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1. Geometria for engineering (edile architettura) (2008, 2009, 2011).

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Teaching at **Université Paris VII**

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1. Mathématiques for Scientific DEUG first year (1995).
2. Mathématiques for Economic DEUG second year (1996).

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Teaching at **Università di Pisa**

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1. Geometria for Physics (1992).

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## Supervision of Students

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- F. Pezzotti (2008, seminar of first year PhD): The curvature flow shrinks a planar curve to a round point.
- S. Spirito (2010, seminar of first year PhD): Two characterizations of the catenoids.
- C. Recchia (2011, seminar of first year PhD): On stability of CMC hypersurfaces in Riemannian manifolds.
- C. Federico (2012, First Level Thesis): Gauss Bonnet Theorem and Applications to Minimal Surfaces.
- M. Santilli (2012, Second Level Thesis): In progress.
- S. Fagioli (2012, seminar of first year PhD): On stability of CMC hypersurfaces in Riemannian manifolds.
- L. Alese (2012, First Level Thesis, Roma La Sapienza): Minimal Surfaces in  $\mathbb{R}^3$ . In progress.