

Ludovica Cotta-Ramusino

Curriculum vitae

Personal

born Milano, Italy
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Current Position

IMA postdoctoral fellow, Institute for Mathematics and its Applications, University of Minnesota, USA.

Education

PhD in Applied Mathematics

December 2007. Supervisor: Prof. John H. Maddocks (Laboratory for Computation and Visualization in Mathematics and Mechanics). École Polytechnique Fédérale de Lausanne, CH.

MPhil in Cosmology

October 2004. Supervisor: Prof. David Wands (Institute of Cosmology and Gravitation). University of Portsmouth, UK.

Laurea in Physics

March 2002, with honors (110/110 *cum laude*). Supervisors: Prof. Daniela Zanon (Università degli Studi di Milano), Prof. Sabino Matarrese (Università degli Studi di Padova) and Prof. Antonio Riotto (INFN, Sezione di Padova & Theory Division, CERN, CH). Università degli Studi di Milano, IT.

Research

Mathematical modelling for biology. In particular, in the field of theoretical and mathematical models for DNA. I have been working on a path integral formalism to evaluate in an efficient way DNA looping probability densities when DNA is described via a continuum elastic rod model. DNA looping is a simple and effective mechanisms characterizing many cellular processes such as transcription and replication.

Cosmological implications of brane-world models, in which our Universe is assumed to be a four dimensional membrane embedded in a higher dimensional spacetime.

Awards

2006

Teaching Award: *Prime de rendement*, EPFL Lausanne, CH.

2002

Research Award: *Introduction to Research in Mathematics*, Department of Mathematics, Università degli Studi di Milano, IT.

Publications

Cotta-Ramusino L. and Wands D., Low-energy effective theory for a Randall-Sundrum scenario with a moving bulk brane, *Phys. Rev. D.* **75**:104001, 2007. ArXiv: hep-th/0609092.

Cotta-Ramusino L., *A Path integral formalism for DNA looping*. PhD thesis, École Polytechnique Fédérale de Lausanne, CH, Thèse no. 4017 (2007)

Teaching experience

Linear Algebra

2003-2007: assistant course Linear Algebra for first year students in Computer Science and Engineering at EPFL (Lausanne, CH). From 2005 up to now, responsible of the Linear Algebra Exercise Sessions.

Analysis

2007: assistant course Analysis II for first year students in Microengineering at EPFL (Lausanne, CH).

Mathematical Modelling of DNA

2006: assistant course Mathematical Modelling of DNA for Master students in Mathematics and Computer Science at EPFL (Lausanne, CH).

Conferences and short term visits

August 2006

Workshop *Nanomechanics of Biomolecules*, 20-25 August, Centro Stefano Franscini, Ascona (CH).

February 2006

Visiting student at the Biocomputing Group, Department of Mathematics, Freie Universität, Berlin (DE).

April-May 2005

Visiting student at the IMA, Institute for Mathematics and its Applications, University of Minnesota, Minneapolis (USA), within the thematic year *Mathematics of Materials and Macromolecules*.

August 2004

Summer School, *DNA and Chromosomes, Physical and Biological Approaches*, Institut d'Études Scientifiques de Cargèse. 2-14 August, Cargese (FR).

August 2003

Summer School, *Particle Physics and Cosmology: The Interface*, Institut d'Études Scientifiques de Cargèse. 4-16 August, Cargese (FR).

Work experience

November 1999 / May 2001

part-time work at the Science and Technology Museum of Milano as a guide to interactive laboratories of Electromagnetism, Telecommunications and Optics. The work primarily involved teaching high school classes during the week (lessons of two or four hours).

Languages and computing skills

Language skills

- *Italian*: native.
- *English*: fluent, both spoken and written. IELTS result (International English Language Testing System), academic form: 8/9 (November 2001).
- *French*: fluent, both spoken and written.

Computing skills

Operating systems: Windows, Linux; Applications: Microsoft office, Latex, Mathematica, Matlab.

Others

Writing

- publishing of a short novel, Casa Editrice *I fiori*, Pavia (Italy).
- *Nanoscienze* published in *Fondazione Informa News*, anno 8, n. 4-5, 2006. Fondazione Carige, Genova (Italy).

Music

- piano studies at the *Civica Scuola di Musica* of Milano, Italy. Singing studies with M^o Susan Lovegrove Graziano until 2002.
- several performances in jazz concerts, both as a soloist and in the quartet *Milano Vocal Ensemble*.

Referees

- Richard D. James *Aerospace Engineering and Mechanics Department
University of Minnesota*

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- John H. Maddocks *Laboratory for computation and visualization in mechanics
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e-mail: john.maddocks@epfl.ch
- David Wands *Institute of Cosmology and Gravitation University of Portsmouth*

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