



# Daniel Ferrante

**Not married**

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## Studies

### **Physics at Syracuse University**

Postgraduate studies

**09/2008 - present**

Postdoctoral Research Associate

### **Physics at Brown University**

PhD

**09/1999 - 08/2008**

Dissertation: "Symmetry Breaking: A New Paradigm for Non-Perturbative QFT and Topological Transitions", <http://arxiv.org/abs/0904.2205>

Supervisor: Gerald S. Guralnik

### **Ciências Moleculares at Universidade de São Paulo**

College

**02/1994 - 05/1999**

Major: Physics, Mathematics

Minor: Computer Science, Chemistry, Biology

Thesis: "Quantum Field Theory: A Modern Primer"

Supervisor: M.C.B. Abdalla

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## Interests

I work with mathematical and non-perturbative aspects of quantum field theories and their relations with spontaneous symmetry breaking (global or local; and how the so chosen parameter space, and its topology, determine the system's quantization); topological quantization; non-commutative spaces and spectral geometry and their relations with deformation and geometric quantization; D-modules; Higgs Bundles; geometric Langlands duality and dualities in general (modular symmetry, mirror symmetry, AdS/CFT, etc); quantum fields in curved spaces.

My scientific papers can be found at,

• [http://arxiv.org/a/ferrante\\_d\\_1](http://arxiv.org/a/ferrante_d_1)

or at,

• <http://www.slac.stanford.edu/spires/find/hep/www?rawcmd=ea+Ferrante,+D+D>

And the link below is to my "Lattes CV" (Brazil),

• <http://lattes.cnpq.br/0783279382148211>

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## Publications

- Ferrante, D. D., Symmetry Breaking: A New Paradigm for Non-Perturbative QFT and Topological Transitions, arXiv:0904.2205 [hep-th]
- Ferrante, D. D. and Guralnik, G. S., Three-Dimensional Gravity, Complex Path Integrals and Phase Transitions (in preparation)
- Ferrante, D. D., Guralnik, G. S. and Pehlevan, C. String Field Theory, Bottomless Actions and Symmetry Breaking (in preparation)
- Ferrante, D. D. and Guralnik, G. S., From Symmetry Breaking to Topology Change I (2006, submitted), arXiv:hep-th/0609190
- Ferrante, D. D. and Guralnik, G. S., Mollifying Quantum Field Theory or Lattice QFT in Minkowski Spacetime and Symmetry Breaking (2006, to be published), arXiv:hep-lat/0602013
- Ferrante, D. D., Democracia e acesso livre ao conhecimento. NEXT Brasil – Instrumentos para a inovação. Brasil, p. 123-136 (2005)
- Guralnik, G. S., Petrov, D., Ferrante, D. D. and Easter, R., A Review Of Two Novel Numerical Methods in QFT (2003), arXiv:hep-lat/0306038
- Ferrante, D. D., Guralnik, G. S., Doll, J. and Sabo, D., Mollified Monte Carlo. Nuclear Physics, B, Proceedings Supplement, v. 119, p. 965-967 (2003), arXiv:hep-lat/0209053
- Guralnik, G. S, Emirdag, P., Petrov, D., Ferrante, D. D., Hahn, S., Easter, R., Doll, J., and Sabo, D., Alternative numerical techniques, Nuclear Physics, B, Proceedings Supplement, v. 119, p. 950-952 (2003), arXiv:hep-lat/0209127
- J.L. deLyra, F. D. Borges, A. Cavalcanti, D. D. Ferrante, A. G. Oliveira Filho, S. Perez, E. R. Sanibria and J. C. C. Souza, Quantum Field Theory – A Radical Lattice Approach, Department of Mathematical Physics, University of São Paulo (IF – USP)
- Ferrante, D. D., “Teoria Quântica de Campo”, Internal notes, Institute of Theoretical Physics, State University of São Paulo, São Paulo (1998)

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## Summary

- &nbsp;Conferences and Extended Visits
- Visiting Scientist, Brown University, Providence, RI, USA (2008–2010)
- 5th Summer School on Particle Physics, Cosmology and Strings, Perimeter Institute , Ontario, Canada (2007)
- 1st & 2nd Northeast String Meeting, Brown University, Providence, RI, USA (2006, 2007)
- 1st, 2nd, 3rd & 4th CAINBRA, Brown University, Providence, RI, USA (2005, 2006, 2007, 2008)
- 100 years of relativity, São Paulo, SP, Brazil (2005)
- 6th, 7th, 8th, 9th & 10th Northeast String Cosmology Meeting, ISCAP, New York, NY, USA (2005, 2006, 2007)
- Complexity, Dimensionality and Scaling, Brown University , Providence, RI, USA (2004)
- Visiting Scientist, Federal University of Ceará, Fortaleza, CE, Brazil (2002)
- Lattice 2002, MIT, Boston, MA, USA (2002)
- &nbsp;Presentations
- &nbsp;O LHC, a Origem do Universo e o Futuro da Física (CAINBRA, Brown University, 2008)
- A Novel Look on QFT: Accessing Non-Perturbative Results (Syracuse University, 2008)
- Non-Perturbative QFT: Phase Transitions, Symmetry Breaking and Topology Change (Brown University, 2007)
- O que é massa: da Relatividade à Mecânica Quântica (CAINBRA, Brown University, 2006)
- Geometrizando a Mecânica Quântica (CAINBRA, Brown University, 2005)
- Chern-Simons Theory and Solitons/Instantons (Brown University, 2004)
- Loop Quantum Cosmology (Parts I and II) (Brown University, 2004)
- Stationary Phase Monte Carlo Methods (Lattice '02, MIT, 2002)
- Mollifier Theory and Its Applications (Brown University, 2002)
- Mollified Monte Carlo (Parts I and II) (UFC, Brazil, 2002)
- Branes: An Introduction (Parts I and II) (UFC, Brazil, 2002)
- The Effects of Spacetime on Yang-Mills Theories (Brown University, 2001)
- Lattice Quantum Field Theory: A Constructive Approach (Brown University, 2001)

## Experience

### **Research Assistance at Brown University**

Research, >200 employees

**09/2001 - 08/2008**

Performed independent research regarding non-perturbative methods in QFT (analytical and numerical) and Quantum Gravity (analytical).

### **System Administrator at Brown University**

Research, >200 employees

**09/2007 - 08/2008**

Assisted Department of Physics with system, network and security management of Windows, Solaris, and GNU/Linux.

### **Teaching Assistant at Brown University**

Higher Education, >200 employees

**09/2007 - 12/2007**

Graded exams and homework; Responsible for e-learning material (lecture summaries and homework solutions)

Course: "Advanced Electromagnetic Theory"

### **Research Computing Proctor at Brown University**

Research, >200 employees

**09/2004 - 08/2007**

System, Network and Security Manager of Windows, Solaris, GNU/Linux, SUN OS, HP-UX, and IRIX

### **Instructor at Brown University**

Higher Education, >200 employees

**06/2007 - 06/2007**

Title: "Current Trends in Physics"

Bibliography: R. Penrose, "The Road to Reality".

### **Instructor at Brown University**

Higher Education, >200 employees

**08/2006 - 08/2006**

Title: "Current Trends in Physics"

Bibliography: R. Penrose, "The Road to Reality".

### **Teaching Assistant at Brown University**

Higher Education, >200 employees

**01/2006 - 05/2006**

Graded exams and homework; Responsible for e-learning material (lecture summaries and homework solutions)

Course: "Advanced Quantum Mechanics"

**Teaching Assistant at Brown University**

Higher Education, >200 employees

**09/2005 - 12/2005**

Graded exams and homework; Responsible for e-learning material (lecture summaries and homework solutions)

Course: "General Relativity & Cosmology"

**Teaching Assistant at Brown University**

Higher Education, >200 employees

**01/2005 - 05/2005**

Graded exams and homework; Responsible for e-learning material (lecture summaries and homework solutions)

Course: "Advanced Quantum Mechanics"

**Instructor at Brown University**

Higher Education, >200 employees

**07/2004 - 07/2004**

Title: "What is Special Relativity?"

Bibliography: Taylor, Wheeler, "Spacetime Physics".

**Teaching Assistant at Brown University**

Higher Education, >200 employees

**01/2004 - 05/2004**

Graded exams and homework; Responsible for e-learning material (lecture summaries and homework solutions)

Course: "Quantum Field Theory"

**Teaching Assistant at Brown University**

Higher Education, >200 employees

**01/2004 - 05/2004**

Graded exams and homework; Responsible for e-learning material (lecture summaries and homework solutions)

Course: "Mechanics"

**Teaching Assistant at Brown University**

Higher Education, >200 employees

**01/2003 - 05/2003**

Graded exams and homework; Responsible for e-learning material (lecture summaries and homework solutions)

Course: "Mechanics"

### **Teaching Assistant at São Paulo University**

Higher Education, >200 employees

**08/1998 - 12/1998**

Graded exams and homework; Responsible for e-learning material (lecture summaries and homework solutions)

Course: "Numerical Analysis"

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## **Awards**

- Robert T. Breyer Award for Service and Scholarship (2009)
  - &nbsp;Sigma Xi, Full Membership
  - &nbsp;Research Computing Proctorship (2004–2007)
  - &nbsp;Award for Excellence in Teaching (2002)
  - &nbsp;National Council of Scientific and Technological Development scholarship (1994–1999)
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## **Skills**

- &nbsp;Operating Systems: DOS, Windows, Mac OS, GNU/Linux, Solaris.
  - Programming Languages: FORTRAN, C/C++, (X)HTML (and CSS), PHP, Perl, Python, make, tcsh, bash.
  - Applications: Maple, Mathematica, Drupal, Moodle, Zope, Plone, Wordpress, Movable Type, TeX, LaTeX, Gnuplot, GIMP, etc.
  - System Administration: Firewall, RAID, Backup tools, DNS, SSH, SSL, Apache, MySQL, NFS, LDAP, NIS, CVS, FTP, IRC, Postfix, IMAP, POP, spam filters, etc.
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## **Languages**

- English: fluent
  - &nbsp;Portuguese: native
  - Spanish, Italian: speak, read and write with basic competence
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## **Clubs & Organizations**

- American Association for the Advancement of Science
  - &nbsp;American Physical Society
  - &nbsp;American Mathematical Society
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