Curriculum Vitae

Patrick B. Greene, Ph.D.

NASA/Fermilab Theoretical Astrophysics Group

Personal Data:

Year of Birth:	1972
Place of Birth:	California, USA
Citizenship:	USA
Languages:	English, conversational German
Present Address:	Fermilab, MS-209 P.O. Box 500 Batavia, IL 60510 USA
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Present position:

Research Associate, NASA/Fermilab Theoretical Astrophysics Group
and
Associate Fellow, University of Chicago Center for Cosmological Physics

Degrees awarded:

2001	Ph.D. in Physics, University of Toronto and the Canadian Institute for Theoretical Astrophysics (CITA). Thesis Title: *Aspects of Preheating after Inflation* Thesis Adviser: Prof. Lev Kofman, CITA
1997	MS in physics, University of Hawaii at Manoa.
1994	BA in physics with Highest Honors in the Major and College Honors, University of California at Santa Cruz (Stevenson College).

Basic scientific interests:

- Inflationary cosmology, preheating and reheating after inflation, supergravity and string theory motivated models of inflation.
- Dark energy and the cosmological constant problem.
- Quantum cosmology.
- Quantum field theory, particle creation in strong fields, and non-equilibrium field theory.
- Particle astrophysics, axion cosmology, lepto/baryogenesis, phase transitions in the early universe.

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Research Experience:

2001–present	Postdoc with the NASA/Fermilab Theoretical Astrophysics Group at Fermi National Accelerator Laboratory. Here I have continued my work on preheating, particularly non-thermal gravitino production, and inflation and have also begun to study dark energy and quantum cosmology.
1996–2001	Graduate Research Assistant at CITA and the University of Hawaii performing numerical and analytic studies in preheating after inflation including the first treatment of fermionic preheating, the structure of bosonic resonances, and the instability of fluctuations in axion cosmology. I began investigating the non-thermal production of gravitinos in supergravity models of inflation.
1994	Undergraduate Thesis (unpublished) Title: *Maxwell's Demon: a Review of its History and Function* Adviser: Prof. A. Peter Young, UCSC
1993	Summer internship at the Lawrence Berkeley National Laboratory working in the Accelerator and Fusion Research Division Adviser: Dr. Malcolm Howells, LBL
1992–93	Undergraduate volunteer work in the Santa Cruz Institute for Particle Physics' "Silicon Strip-and-Chip" lab. Adviser: Prof. Hartmut Sadrozinski, UCSC/SCIPP

Teaching Experience:

1998–2001	Teaching Assistantship at the University of Toronto leading discussions in introductory physics.
1994–98	Teaching Assistantship at the University of Hawaii leading labs and discussion sections in elementary and introductory physics.
1992–94	Undergraduate marker for introductory and upper-division undergraduate courses in physics at UC Santa Cruz.

Computing Experience:

Languages:	C, HTML, Maple programming
Applications:	Maple (with GRTensorII), Gnuplot, IDL, TeX/LaTeX, Paint Shop Pro

Activities:

Present	Organizing the Fermilab "de Sitter Days: $\alpha_{\rm vac}$ to Ω_Λ" Workshop. Workshop URL: `http://home.fnal.gov/~pbg/dSDays/`
Present	Referee for *Phys. Rev. D, Phys. Rev. Lett., Phys. Lett. B,* and the *American Journal of Physics*
2003	Organized the Fermilab theoretical astrophysics group's seminars for Spring 2003. Also inaugurated a new series of joint cosmology and particle theory seminars.
1998–2000	Co-organized the CITA/UT-Physics String Theory Study Group.
1997–98	Academic Chair, University of Hawaii Graduate Student Organization (GSO).
1997–98	GSO representative to the University of Hawaii re-accreditation preparatory review board.
1996–97	UH Physics Department representative to the GSO.
1995-1997	Volunteer lecturer for high school physics classes speaking about relativity and black holes.

Awards, Honors:

1999-2001	E.C. Stevens Fellowship at the University of Toronto.
1998	Lachlan Gilchrist Scholarship and University Fellowship at the University of Toronto.
1997	Graduate Student Travel Fund award from the University of Hawaii Graduate Student Organization.
1994	Highest Honors in Major and College Honors at UC Santa Cruz.
1991	Resident Honor student and Dean's Fellow at the University of Southern California, Los Angeles, CA.

Academic References:

- Prof. Lev Kofman, Canadian Institute for Theoretical Astrophysics, 60 St. George Street, Toronto, ON M5S 3H8, Canada; email `kofman@cita.utoronto.ca`
- Prof. Andrei Linde, Dept. of Physics, Stanford University, Stanford, CA 94305; email `linde@physics.stanford.edu`
- Prof. J.R. Bond, Canadian Institute for Theoretical Astrophysics, 60 St. George Street, Toronto, ON M5S 3H8, Canada; email `bond@cita.utoronto.ca`
- Prof. Rocky Kolb, NASA/Fermilab Theoretical Astrophysics Group, Fermilab MS-209, P.O. Box 500, Batavia, IL, USA; email `rocky@fnal.gov`
- Prof. Scott Dodelson, NASA/Fermilab Theoretical Astrophysics Group, Fermilab MS-209, P.O. Box 500, Batavia, IL, USA; email `dodelson@fnal.gov`

Technical Publications:

- C. Armendáriz-Picón and P.B. Greene, "Spinors, Inflation, and Non-Singular Cyclic Cosmologies," *Gen. Rel. Grav.* 35 (2003) 1635; eprint: `hep-th/0301129`
- M. Ahmed, S. Dodelson, P.B. Greene, and R. Sorkin, "Everpresent Lambda," submitted to *Phys. Rev.* **D**; eprint: `astro-ph/0209274`
- P.B. Greene, K. Kadota, and H. Murayama, "Supergravity Inflation Free from Harmful Relics," *Phys. Rev.* **D68** (2003) 043502; eprint: `hep-ph/0208276`
- G. Felder, J. García-Bellido, P.B. Greene, L. Kofman, A. Linde, and I. Tkachev, "Dynamics of Symmetry Breaking and Tachyonic Preheating," *Phys. Rev. Lett.* **87** (2001) 011601; eprint: `hep-ph/0012142`
- P.B. Greene and L. Kofman, "On the Theory of Fermionic Preheating," *Phys. Rev.* **D62** (2000) 123516; eprint: `hep-ph/0003018`
- P.B. Greene and L. Kofman, "Preheating of Fermions," *Phys. Lett.* **B 448** (1999) 6–12; eprint: `hep-ph/9807339`
- P.B. Greene, "Inflationary Reheating and Fermions," in *COSMO-98: the 2nd International Workshop on Particle Physics and the Early Universe*, ed. D. Caldwell (AIP, Woodbury, NY, 1999) 72-74; eprint: `hep-ph/9905256`
- P.B. Greene, L. Kofman, and A.A. Starobinsky, "Sine-Gordon Parametric Resonance," *Nucl. Phys.* **B 543** (1999) 423-443; eprint: `hep-ph/9808477`
- P.B. Greene, "Preheating after Inflation in the Theory $\frac{\lambda}{4}\phi^4 + \frac{1}{2}g^2\phi^2\chi^2$," in *COSMO-97: the 1st International Workshop on Particle Physics and the Early Universe*, ed. L. Roszkowski (World Scientific, 1998)
- P.B. Greene, L. Kofman, A.D. Linde, and A.A. Starobinsky, "Structure of Resonance in Preheating after Inflation," *Phys. Rev.* **D 56** (1997) 6175-6192; eprint: `hep-ph/9705347`

Talks and Seminars:

- "The Cosmological Constant and Quantum Cosmology," seminar for the relativity group at the University of Wisconsin, Milwaukee (Jul. 2003).
- "Spinor Fields in Curved Space-Time," lecture for the University of Chicago Early Universe Study Group, Chicago, IL (Spring 2003).
- "Everpresent Lambda," invited seminars at LBL, UC Davis, KAIST (South Korea), and the University of Hawaii (Oct. & Nov. 2003).
- "Everpresent Lambda," talk at COSMO-02, the 6th International Workshop on Particle Physics and the Early Universe, Chicago, IL (Sep. 2002).
- "Everpresent Lambda, Dark Energy, and Quantum Cosmology," invited talk at the Santa Fe 2002 Cosmology Summer Workshop, Santa Fe, NM (Jul. 2002).
- "All About Preheating," Fermilab Theoretical Astrophysics seminar, Batavia, IL (Spring 2002).
- "Cosmic Quenches and Tachyonic Preheating," seminar at Stanford University, Stanford, CA (Jan. 2001).
- "Tachyonic Preheating and Hybrid Inflation," talk at Kingston 2000–the CITA Reunion Meeting, Toronto, Canada (Aug. 2000)
- "Inflation and the Origin of Matter in the Universe," talk for the Physics Graduate Student Series, University of Toronto, Canada (Dec. 1999)
- "Preheating and Fermions," talk at COSMO-99, the 3rd International Workshop on Particle Physics and the Early Universe, ICTP, Trieste, Italy (Oct. 1999).
- "Preheating after Inflation," Fermilab Theoretical Astrophysics seminar, (Apr. 1999).
- "Preheating of Fermions (and Axions)," talk at COSMO-98, the 2nd International Workshop on Particle Physics and the Early Universe, Asilomar, California, USA (Nov. 1998).
- "The End of Inflation," high energy physics group seminar, University of Hawaii (Aug. 1998).
- "Structure of the Resonance in Preheating," talk at COSMO-97, the 1st International Workshop on Particle Physics and the Early Universe, Ambelside, UK (Sep. 1997).

Other Workshops and Schools Attended:

- *The Davis Meeting on Cosmic Inflation*, UC Davis, Davis, CA (Mar. 2003).
- *Quantum gravity in the Southern Cone III*, Conference at the Centro de Estudios Cientificos, Valdivia, Chile (Jan. 2002).
- *School on Quantum Gravity*, summer school at the Centro de Estudios Cientificos, Valdivia, Chile (Jan. 2002).