

## CURRICULUM VITAE

### PABLO LAGUNA

Department of Astronomy & Astrophysics  
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Pennsylvania State University  
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#### Education:

- 1987 Institution: The University of Texas at Austin  
Degree: Ph.D. in Physics  
Supervisor: Professor Richard A. Matzner  
Dissertation: "Cosmological Applications of Singular Hypersurfaces in General Relativity"
- 1981 Institution: Universidad Autónoma Metropolitana, Iztapalapa, México  
Degree: B.S. in Physics  
Honors: President's Honors List

#### Experience:

- 2001 – Associate Director, Center for Gravitational Wave Physics  
Pennsylvania State University
- 2001 – 2006 Associate Director, Institute for Gravitational Physics & Geometry  
Pennsylvania State University
- 2000 Professor of Astronomy & Astrophysics and Physics  
Pennsylvania State University
- 1992 – 2001 Consultant, Theoretical Astrophysics Group  
Los Alamos National Laboratory
- 1998 – 2000 Associate Professor of Astronomy & Astrophysics  
Pennsylvania State University
- 1992 – 1998 Assistant Professor of Astronomy & Astrophysics  
Pennsylvania State University
- 1990 – 1992 Post Doctoral Fellow, Theoretical Astrophysics Group  
Los Alamos National Laboratory
- 1989 – 1990 Visiting Assistant Professor of Physics  
Drexel University, Philadelphia
- 1987 – 1989 Post Doctoral Fellow, Center for Relativity  
University of Texas at Austin

#### Honors and Awards

- 1993 National Science Foundation Young Investigator Award
- 1984 CONACyT Fellowship, Mexico
- 1983 Organization of American States Fellowship
- 1982 University of Texas Ex-students Association Fellowship
- 1981 Mexican Presidential Award

## Memberships

- 2007 – Committee of Minorities, American Physical Society
- 2007 – Editorial Board, Research Letters in Physics
- 1995 – Institute for High Performance Computing Applications, Penn State University
- 1995 – American Physical Society
- 1992 – American Astronomical Society
- 2004 – 2005 Editorial Board, International Journal of Modern Physics A
- 2004 – 2005 Editorial Board, Modern Physics Letters A
- 1999 – 2005 Allocations Board, National Partnership for Advanced Computational Infrastructure
- 1998 – 2006 Editorial Board, International Journal of Modern Physics D

## Post-Doctoral Fellows Supervised:

- 2005 – Ian Hinder
- 2005 – Frank Herrmann
- 2003 – 2006 Carlos Sopena
- 2002 – 2005 Ulrich Sperhake
- 2001 – 2002 Claudia Moreno
- 2000 – 2001 Manuel Tiglio
- 1999 – 2002 Deirdre Shoemaker
- 1998 – 2000 Mijan Huq
- 1998 – 1999 Steve Brandt
- 1997 – 1999 Karen Camarda
- 1995 – 1996 Hans-Peter Nollert
- 1995 – 1996 Philip Papadopoulos
- 1994 – 1995 Robin Tuluie

## Ph.D. Students Supervised:

- 2006 – Shaun Wood
- 2006 – Manodeep Sinha (co-supervisor with K. Holley-Bockelmann)
- 2005 – Andrew Knapp
- 2004 – Emily Alicea-Muñoz (Co-supervisor with C. Miller)
- 2005 – 2006 Eloisa Bentivegna (co-supervisor with D. Shoemaker)
- 2004 – 2007 Abraham Harte
- 2004 – 2005 Cristian Saez
- 2000 – 2004 Kenneth Smith
- 2000 – 2004 Bernard Kelly
- 1999 – 2002 David Garrison (co-supervisor with J. Pullin)
- 1999 – 2000 Erik Schnetter
- 1997 – 2000 Ramon Lopez-Aleman (co-supervisor with J. Pullin)
- 1997 – 1999 Mike Sipior
- 1997 – 1999 Johannes Ruoff
- 1995 – 1996 William Krivan
- 1995 – 1996 Alin Panaitescu (co-supervised with P. Mészáros)

## M.S. Students Supervised:

- 2005 – 2006 Nick Harrison
- 2002 – 2003 Symeon Konstantinidis
- 1996 – 1997 Donald Driscoll
- 1995 – 1996 Jurgen Zimmermann
- 1994 – 1996 Mark Shepherd
- 1994 – 1995 Linqing Wen

### Undergraduate Students Supervised:

2007 –	Matt Washik
2007 –	Jason Hwang
2004 – 2007	Racheal Peet
2005 – 2006	Padraic Finnerty
2004 – 2005	Edward Cazalas
2003 – 2005	Tyler Landis
2002 – 2003	Praj Kulkarni (Honors Thesis)
2000 – 2003	Steve Segal (Honors Thesis)
2000 – 2003	Sean McWilliams (Honors Thesis)
1998 – 2000	Patrick Allison (Honors Thesis)
1995 – 1997	Holly Nordquist
1994 – 1996	Josh Bish (Honors Thesis)
1994 – 1995	Deirdre Shoemaker (Honors Thesis)
1993	Damien Easson
1993	Art Freeman

### Publications in Refereed Journals:

1. Laguna-Castillo, P. and Matzner, R.A. "Inflation and Bubbles in General Relativity," *Phys. Rev. D* **34**, 2913 (1986).
2. Laguna-Castillo, P. and Matzner, R.A. "Surfaces of Discontinuity in Five-dimensional Kaluza-Klein Cosmologies," *Nucl. Phys. B* **282**, 542 (1987).
3. Laguna-Castillo, P. and Matzner, R.A. "Discontinuity Cylinder Model of Gravitating U(1) Cosmic Strings," *Phys. Rev. D* **35**, 2933 (1987).
4. Laguna-Castillo, P. and Matzner, R.A. "Coupled Field Solutions for U(1) Gauge Cosmic Strings," *Phys. Rev. D* **36**, 3663 (1987).
5. Amsterdamski, P. and Laguna-Castillo, P. "Internal Structure and the Spacetime of Superconducting Bosonic Strings," *Phys. Rev. D* **37**, 877 (1988).
6. Garfinkle, D. and Laguna, P. "Contribution of Gravitational Self-interaction to  $\Delta\phi$  and  $\mu$  for a Cosmic String," *Phys. Rev. D* **39**, 1552 (1989).
7. Laguna, P. and Matzner, R.A. "Peeling U(1) Gauge Cosmic Strings," *Phys. Rev. Lett.* **62**, 1948 (1989).
8. Laguna, P. and Garfinkle, D. "Spacetime of Supermassive U(1) Gauge Cosmic Strings," *Phys. Rev. D* **40**, 1011 (1989).
9. Laguna, P. and Matzner, R.A. "Numerical Simulation of Bosonic Superconducting String Interactions," *Phys. Rev. D* **41**, 1751 (1990).
10. Laguna, P., Kurki-Suonio, H. and Matzner, R.A. "Inhomogeneous Inflation: The Initial Value Problem," *Phys. Rev. D* **44**, 3077 (1991).
11. Laguna, P., Miller, W.A. and Zurek, W.H. "Smoothed Particle Hydrodynamics Near a Black Hole," *Astrophys. J.* **404**, 678 (1993).
12. Laguna, P., Miller, W.A., Zurek, W.H. and Davies, M.B. "Tidal Disruptions by Supermassive Black Holes: Hydrodynamic Evolution of Stars on a Schwarzschild Background," *Astrophys. J.* **410**, L83 (1993).
13. Mészáros, P., Laguna, P. and Rees, M.J. "Gasdynamics of Relativistically Expanding Gamma-Ray Burst Sources: Kinematics, Energetics, Magnetic Fields and Efficiency," *Astrophys. J.* **415**, 181 (1993).
14. Kurki-Suonio, H., Laguna, P. and Matzner, R.A. "Inhomogeneous Inflation: Numerical Evolution," *Phys. Rev. D* **48**, 3611 (1993).

15. Laguna, M. and Laguna, P. "Applying Tabu Search to Statistical Mechanics," *I.J.M.P. C* **6**, 11 (1995)
16. Laguna, P. "Smoothed Particle Interpolation," *Astrophys. J.* **439**, 814 (1995).
17. Charlton, J. and Laguna, P. "Competition of Supermassive Black Holes and Galactic Spheroids in the Destruction of Globular Clusters," *Astrophys. J.* **444**, 193 (1995).
18. Tuluie, R. and Laguna, P. "The Imprint of Proper Motion of Nonlinear Structures on the Cosmic Microwave Background," *Astrophys. J.* **445**, L73 (1995).
19. Tuluie, R., Laguna, P. and Anninos, P. "Cosmic Microwave Background Anisotropies from the Rees-Sciama Effect in  $\Omega_0 \leq 1$  Universes," *Astrophys. J.* **463**, 15 (1996).
20. Gomez, R., Laguna, P., Papadopoulos, P. and Winicour, J. "Cauchy-Characteristic Evolution of Einstein-Klein-Gordon Systems," *Phys. Rev. D* **54**, 4719 (1996).
21. Krivan, W., Laguna, P. and Papadopoulos, P. "Dynamics of Scalar Fields in the Background of Rotating Black Holes," *Phys. Rev. D* **54**, 4728 (1996).
22. Papadopoulos, P. and Laguna, P. "Cauchy-characteristic Evolution of Einstein-Klein-Gordon Systems: The Black Hole Regime," *Phys. Rev. D* **55**, 2038 (1997).
23. Brady, P.R., Chambers, C.M., Krivan, W. and Laguna, P. "Telling Tails in the Presence of a Cosmological Constant," *Phys. Rev. D* **55**, 7538 (1997).
24. Bettencourt, L., Laguna, P. and Matzner, R. "Non-Intercommuting Cosmic Strings," *Phys. Rev. Lett.* **78**, 2066 (1997).
25. Laguna, P. and Zurek, W.H. "Density of Kinks After a Quench: When Symmetry Breaks, How Big Are the Pieces?," *Phys. Rev. Lett.* **78**, 2519 (1997).
26. Panaitescu, A., Wen, L., Laguna, P. and Mészáros, P. "Impact of Relativistic Fireballs on External Matter: Numerical Models of Cosmological Gamma-Ray Burst," *Astrophys. J.* **482**, 942 (1997).
27. Wen, L., Panaitescu, A. and Laguna, P. "A Shock Patching Code for Ultra-Relativistic Fluid Flows," *Astrophys. J.* **486**, 919 (1997).
28. Laguna, P. and Wolszczan, A. "Pulsar Arrival Times from Binary Pulsars with Rotating Black Hole Companions," *Astrophys. J.* **486**, L27 (1997).
29. Krivan, W., Laguna, P., Papadopoulos, P. and Andersson, N. "Dynamics of Perturbations of Rotating Black Holes," *Phys. Rev. D* **56**, 3395 (1997).
30. A. M. Abrahams, L. Rezzolla, M. E. Rupright, A. Anderson, P. Anninos, T. W. Baumgarte, N. T. Bishop, S. R. Brandt, J. C. Browne, K. Camarda, M. W. Choptuik, G. B. Cook, C. R. Evans, L. S. Finn, G. Fox, R. Gomez, T. Haupt, M. F. Huq, L. E. Kidder, S. Klasky, P. Laguna, W. Landry, L. Lehner, J. Lenaghan, R. L. Marsa, J. Masso, R. A. Matzner, S. Mitra, P. Papadopoulos, M. Parashar, F. Saied, P. E. Saylor, M. A. Scheel, E. Seidel, S. L. Shapiro, D. Shoemaker, L. Smarr, B. Szilagyi, S. A. Teukolsky, M. H. P. M. van Putten, P. Walker, J. Winicour, J. W. York Jr "Gravitational Wave Extraction and Outer Boundary Conditions by Perturbative Matching," *Phys. Rev. Lett.* **80**, 1812 (1998)
31. Cook, G.B., M. F. Huq, S. Klasky, M. A. Scheel, A. M. Abrahams, A. Anderson, P. Anninos, T. W. Baumgarte, N. T. Bishop, S. R. Brandt, J. C. Browne, K. Camarda, M. W. Choptuik, C. R. Evans, L. S. Finn, G. Fox, R. Gomez, T. Haupt, L. E. Kidder, P. Laguna, W. Landry, L. Lehner, J. Lenaghan, R. L. Marsa, J. Masso, R. A. Matzner, S. Mitra, P. Papadopoulos, M. Parashar, L. Rezzolla, M. E. Rupright, F. Saied, P. E. Saylor, E. Seidel, S. L. Shapiro, D. Shoemaker, L. Smarr, B. Szilagyi, S. A. Teukolsky, M. H. P. M. van Putten, P. Walker, J. Winicour, J. W. York Jr "Boosted 3-dimensional Black Hole Evolutions with Singularity Excision," *Phys. Rev. Lett.* **80**, 2512 (1998)

32. Gomez, R., L. Lehner, R. L. Marsa, J. Winicour, A. M. Abrahams, A. Anderson, P. Anninos, T. W. Baumgarte, N. T. Bishop, S. R. Brandt, J. C. Browne, K. Camarda, M. W. Choptuik, G. B. Cook, C. R. Evans, L. S. Finn, G. Fox, R. Gomez, T. Haupt, M. F. Huq, L. E. Kidder, S. Klasky, P. Laguna, W. Landry, L. Lehner, J. Lenaghan, R. L. Marsa, J. Masso, R. A. Matzner, S. Mitra, P. Papadopoulos, M. Parashar, L. Rezzolla, M. E. Rupright, F. Saied, P. E. Saylor, M. A. Scheel, E. Seidel, S. L. Shapiro, D. Shoemaker, L. Smarr, B. Szilagyi, S. A. Teukolsky, M. H. P. M. van Putten, P. Walker, J. Winicour, J. W. York Jr "Stable Characteristic Evolution of Generic 3-dimensional Single-black-hole Spacetimes," *Phys. Rev. Lett.* **80**, 3915 (1998)
33. Laguna, P. and Zurek, W.H. "Critical Dynamics of Symmetry Breaking: Quenches Dissipation and Cosmology," *Phys. Rev. D* **58**, 87502 (1998)
34. Andersson, N., Laguna, P. and Papadopoulos, P. "Dynamics of scalar fields in the background of rotating black holes II: A note on superradiance," *Phys. Rev. D* **58**, 85021 (1998)
35. Nordquist, H.K., Klinger, R.J., Laguna, P. and Charlton, J.C. "Distortion of Globular Clusters by Galactic Bulges," *M.N.R.A.S.* **304**, 288 (1999)
36. Dziarmaga, J., Laguna, P. and Zurek, W.H. "Symmetry Breaking with a Slant: Topological Defects after an Inhomogeneous Quench," *Phys. Rev. Lett.* **82**, 4749 (1999)
37. Laguna, P. "Linear-nonlinear Formulation of Einstein Equations for the Two-body Problem in General Relativity," *Phys. Rev. D* **60**, 084012 (1999)
38. Allen, G., Andersson, N., Kokkotas, K., Laguna, P., Pullin, P. and Ruoff, J. "Close-limit Approximation to Neutron Star Collisions," *Phys. Rev. D* **60**, 104021 (1999)
39. Andersson, N., Kokkotas, K., Laguna, P., Papadopoulos, P. and Sipiior, M. "Construction of Initial Data for Perturbations of Relativistic Stars," *Phys. Rev. D* **60**, 124004 (1999)
40. Khanna, G., Gleiser, R., Laguna, P., Nicasio, O., Nollert, H.-P., Price, R., and Pullin, J. "Inspiralling Black Holes: The Close-Limit," *Phys. Rev. Lett.* **83**, 3581 (1999)
41. Marronetti, P., Huq, M., Laguna, P., Lehner, L., Matzner, R. and Shoemaker, D. "Approximate Analytical Solutions to the Initial Data Problem of Black Hole Binary Systems," *Phys. Rev. D* **62**, 024017 (2000)
42. Brandt, S., Correll, R., Gomez, R., Huq, M., Laguna, P., Lehner, L., Neilsen, D., Matzner, R.A., Pullin, J., Schnetter, E., Shoemaker, D., and Winicour, J. "Grazing Collisions of Black Holes via the Excision of Singularities," *Phys. Rev. Lett.* **85**, 5496 (2000)
43. Ruoff, J., Laguna, P. and Pullin, J. "Excitation of Neutron Star Oscillations by an Orbiting Particle," *Phys. Rev. D* **63**, 064019 (2001)
44. Campanelli, M., Khanna, G., Laguna, P., Pullin, J. and Ryan M., "Perturbations of the Kerr spacetime in horizon penetrating coordinates," *Class. Quant. Grav.* **18**, 18 (2001)
45. Gentle, A., Holtz, D.E., Kheifets, A., Laguna, P. and Miller, W.A. "Constant Crunch Coordinates for Black Hole Simulations," *Phys. Rev. D* **63**, 064024 (2001)
46. Kelly, B., Laguna, P., Lockitch, K., Pullin, J., Schnetter, E., Shoemaker, D. and Tiglio, M., "A cure for unstable numerical evolutions of single black holes: adjusting the standard ADM equations," *Phys. Rev. D* **64**, 084013 (2001).
47. Laguna, P. and Shoemaker, D. "Numerical stability of a new conformal-traceless 3+1 formulation of the Einstein equation," *Class. Quant. Grav.* **19**, 19 (2002)
48. Shoemaker, D., Smith, K., Spherhake, U., Laguna, P., Schnetter, E. and Fiske, D. "Moving black holes via singularity excision," *Class. Quant. Grav.* **20**, 20 (2003).

49. Tichy, W., Bruegmann, B. and Laguna, P. "Gauge conditions for binary black hole puncture data based on an approximate helical Killing vector," *Phys. Rev. D* **68**, 064008 (2003).
50. Sperhake, U., Smith, K., Kelly, B., Laguna, P. and Shoemaker, D. "Impact of densitized lapse slicings on evolutions of a wobbling black hole," *Phys. Rev. D* **69**, 024012 (2004).
51. Laguna, P., "Conformal-thin-sandwich initial data for a single boosted or spinning black hole puncture," *Phys. Rev. D* **69**, 104020 (2004).
52. Bogadnovic, T.B., Eracleous, M., Mahadevan, S., Laguna, P. and Sigurdsson, "Tidal Disruption of a Star by a Black Hole: Observational Signature," *Astrophys. J.* **610**, 855 (2004).
53. Kobayashi, S., Laguna, P., Phinney, E.S. and Meszaros, P., "Gravitational Wave and X-ray Signals from Stellar Disruption by a Massive Black Hole," *Astrophys. J.* **615**, 855 (2004).
54. Sperhake, U., Kelly, B., Laguna, P., Smith, K.L., Schnetter, E., "Black hole head-on collisions and gravitational waves with fixed mesh-refinement and dynamic singularity excision," *Phys. Rev. D* **71**, 124042 (2005).
55. Sopena, C.F., Sun, P., Laguna, P. and Xu, J., "A Toy Model for Testing Finite Element Methods to Simulate Extreme-Mass-Ratio Binary Systems," *Class. Quant. Grav.* **23**, 23 (2006).
56. Sopena, C.F. and Laguna, P. "A Finite Element Computation of the Gravitational Radiation emitted by a Point-like object orbiting a Non-rotating Black Hole," *Phys. Rev. D* **73**, 044028 (2006)
57. Sopena, C.F., Sperhake, U. and Laguna, P. "Hydro-without-hydro framework for simulations of black hole-neutron star binaries," *Class. Quant. Grav.* **23**, 23 (2006)
58. Sopena, C.F., Yunes, N. and Laguna, P. "Gravitational Recoil from Binary Black Hole Mergers:the Close-Limit Approximation" *Phys. Rev. D* **74**, 124010 (2006)
59. Laguna, P., Natchu, V., Matzner, R.A. and Vachaspati, T. "Intercommutation of Semilocal Strings and Skyrmions," *Phys. Rev. Lett.* **98**, 041602 (2007)
60. Laguna, P. "Numerical analysis of the big bounce in loop quantum cosmology," *Phys. Rev. D* **75**, 024033 (2007)
61. Sopena, C.F., Yunes, N. and Laguna, P. "Gravitational recoil velocities from eccentric binary black hole mergers" *Astrophys. J. Lett.* **656**, L9 (2007)
62. Herrmann, F., Hinder, I., Shoemaker, D. Laguna, P. and Matzner, R.A. "Gravitational recoil from spinning binary black hole mergers," *Astrophys. J.* **661**, 430 (2007)
63. Herrmann, F., Hinder, I., Shoemaker, D. and Laguna, P. "Unequal-Mass Binary Black Hole Inspirals," *Class. Quant. Grav.* **24**, 24 (2007)
64. Herrmann, F. Hinder, I., Shoemaker, D.M., Laguna, P. and Matzner, R.M. "Binary Black Holes: Spin Dynamics and Gravitational Recoil," accepted *Phys.Rev. D* (2007)
65. Rantsiou, E., Kobayash, S., Laguna, P. and Rasio, F. "Mergers of Black Hole – Neutron Star binaries. I. Methods and First Results," submitted *Astrophysical J.* (2007)

#### Parts of Books:

1. Laguna, P. "Do Bosonic Superconducting Strings Intercommute?," in *Cosmic Strings: The Current Status*, eds. F.S. Accetta and L.M. Krauss, World Scientific, Singapore (1988).
2. Laguna, P., Miller, W.A. and Zurek, W.H. "Tidal Disruption of a Star by a Supermassive Black Hole," in *Proceedings 254 AIP Conference "Testing the AGN Paradigm,"* College Park, Maryland (1991).

3. Laguna, P., Kurki-Suonio, H. and Matzner, R.A. "Three-Dimensional Numerical Study of Inhomogeneous Chaotic Inflation," in Proceedings of the Sixth Grossmann Meeting on General Relativity, Kyoto, Japan, eds. H. Sato, T. Nakamura and R. Ruffini, World Scientific, Singapore (1992).
4. Laguna, P., Miller, W.A. and Zurek, W.H. "SPH Simulations of Tidal Compression of Stars by Black Holes," in Proceedings of the OAT-SISSA International Workshop SPH in Astrophysics, eds. G. Bono and J.C. Miller, *Mem.S.A.It.*, vol. 65 (1993).
5. Tuluie, R. and Laguna, P. "Chasing CMB Photons Through the Nonlinear Universe," in Proceedings of the 17th Texas Symposium on Relativistic Astrophysics, Munich, Germany (1994).
6. Laguna, P. and Tuluie, R. "The Effect of Large Scale Structures on the Cosmic Microwave Background Radiation," in Inhomogeneous Cosmological Models, Proceedings of the Spanish Relativity Meeting, eds. A. Molina and J.M.M. Senovilla, World Scientific, Singapore (1995).
7. Laguna, P. "Alternatives to Finite Differences in Numerical Relativity," in Proceedings Relativity and Scientific Computing Workshop, Bad Honnef, Germany eds. F.W. Hehl, R.A. Puntigam and H. Ruder, Springer, Berlin (1996).
8. Laguna, P. "The Grand Challenge in Computational Gravitation: Collisions of Black Holes," in Proceedings Sixth Conference on Theoretical Physics: General Relativity and Gravitation, Bistrita, Rumania eds. D.N. Vulcanov and I.I. Cotaescu, Mirton (1996).
9. Krivan, W., Laguna, P. and Papadopoulos, P. "Dynamics of spin-2 fields in Kerr background geometries," in Proceedings of the 18th Texas Symposium on Relativistic Astrophysics, Chicago, IL (1996).
10. Laguna, P. "Black Hole Collisions: A Computational Grand Challenge," in Proceedings International Conference on Gravitational Waves: Sources and Detectors, Pisa, Italy eds. I. Ciufolini and F. Fidicaro, World Scientific (1997).
11. Laguna, P. and Zurek, W.H. "Density of Topological Defects After a Quench," in Recent Developments in Gravitation and Mathematical Physics, Proceedings of the 2nd Mexican School on Gravitation and Mathematical Physics Tlaxcala, Mexico, eds. Garcia, A. et al. Science Network Publishing Konstanz (1997).
12. Chambers, C.M., Brady, P.R., Krivan, W. and Laguna, P. "Some Cosmological Tails of Collapse," in Proceedings of 'The Eight Marcel Grossmann Meeting on General Relativity', 22-27 June 1997, The Hebrew University, Jerusalem, Israel
13. Laguna, P. "Stellar Disruptions by Massive Black Holes: Fluid Flows in Curved Space-Times" in Relativistic Astrophysics, eds. H. Riffert, H. Ruder, H.-P. Nollert. and F.W. Hehl, Vieweg (1998).
14. Laguna, P. "Langevin Equation: Symmetry Breaking Phase Transitions," in The PDE Coffee Table Book, eds. Embree, K. and Trefethen, N, Oxford University Press (2000).
15. Bogdanović, T., Eracleous, M., Mahadevan, S., Sigurdsson, S. and Laguna, P., "Observational Signature of Tidal Disruption of a Star by a Massive Black Hole," IAU Symposium No. 222: The Interplay among Black Holes, Stars and ISM in Galactic Nuclei, held in Gramado, Brazil, March 1-5, 2004.
16. Laguna, P. and Shoemaker, D.M., "Computational Black Hole Dynamics," in Proceeding of the Second Aegean Summer School on the Early Universe, Ermoupoli, Syros, Greece, September, 2004
17. Bogdanović, T., Eracleous, M., Mahadevan, S., Sigurdsson, S. and Laguna, P., "Observational Signature of Tidal Disruption of a Star by a Massive Black Hole," Proceedings of 22nd Texas Symposium on Relativistic Astrophysics, Dec 13-17, 2004., eds. P. Chen and G. Madejski
18. Rasio, F., Faber, J., Kobayashi, S., and Laguna, P., "Relativistic SPH Calculations of Compact Binaries," in 14th Workshop on General Relativity and Gravitation, Yukawa Institute for Theoretical Physics, Kyoto, Japan, February 2005

19. Laguna, P., "Probing space-time through numerical simulations," in "100 Years of Relativity Space-time Structure: Einstein and Beyond," ed. A. Ashtekar, World Scientific (2005).
20. Sperhake, U., Kelly, B., Laguna, P., Smith, K.L., Schnetter, E., "Gravitational waves from black hole collisions," in proceedings of the 7th International Conference of the Hellenic Astronomical Society (2005).
21. Shoemaker, D., Kidder, L., Laguna, P., Linblom, L., Pfeiffer, H., Scheel, M. and Teukolsky, S., "Mining for Observables: A New Challenge for Numerical Relativity," in proceedings of the 7th International Conference of the Hellenic Astronomical Society (2005).
22. Laguna, P., "When Black Holes Collide," in proceedings of the 7th International Conference of the Hellenic Astronomical Society (2005).
23. Herrmann, F., Hinder, I., Shoemaker, D. and Laguna, P. "Binary Black Holes and Recoil Velocities," in proceedings 6th International LISA Symposium 2006, *AIP Conf. Proc.* **873**, 89 (2006)
24. Bentivegna, B., Laguna, P. and Shoemaker, D. "The effect of gauge conditions on waveforms from binary black hole coalescence," in proceedings 6th International LISA Symposium 2006, *AIP Conf. Proc.* **873**, 94 (2006).