

## Carlo Rovelli

Centre de Physique Theorique  
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F-13288 Marseille, France

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<http://www.cpt.univ-mrs.fr/~rovelli>

### Present position

- *Professeur de classe exceptionnelle*, Université de la Méditerranée, Marseille, France.

### Honorary positions

- *Institut Universitaire de France*, Senior Member.
- *Beijing Normal University, Beijing, China*, Honorary Professor.
- *Académie Internationale de Philosophie des Sciences*, Membre Titulaire.
- *Accademia di Agricoltura Scienze e Lettere di Verona*, Honorary Member.
- *Department of History and Philosophy of Science, Pittsburgh University*, Affiliated Professor.

### Education

1970-1975	Liceo Maffei, Verona	Classical studies
1975-1981	Università di Bologna	Laurea in Fisica (with honors)
1983-1986	Università di Padova	Dottorato di Ricerca (Ph.D.) in Physics

### Professional Employment

2006-pres	Université de la Méditerranée	Professeur de classe exceptionnelle
2000-2006	Université de la Méditerranée	Professeur (1ere classe)
1999-2000	Pittsburgh University	Full Professor
1998-1999	CPT Luminy	Directeur de Recherche
1994-1999	Pittsburgh University	Associate Professor
1990-1994	Pittsburgh University	Assistant Professor
1988-1989	Università dell'Aquila	Professore a contratto
1989	Sissa, Trieste	Post-Doctoral position
1989	Syracuse University	Visiting Fellow
1987	Yale University	Post-doctoral Fellowship
1987-1988	Università di Roma	INFN Post-doctoral position
1986	Imperial College London	Visiting position

### Awards and honors

- *Chancellor Distinguished Research Award*, University of Pittsburgh 1993.
- *1994 Annual Series Lecturer*, Pittsburgh Center for Philosophy of Science.
- *Xanthopoulos Award*, Triennial International Prize in Relativity, 1995.
- *Gravity Research Foundation, Second Award 1996*, and Honorable mention 1995 and 2002.
- *Idoneo* al concorso Professore Universitario di Prima Fascia, Università di Lecce, Maggio 2000.
- *Chiamata per chiara fama* (Honor nomination) voted by Rome University Physics Dept, 2002.
- *Prix du Rayonnement International*, Festival des Sciences et des Technologies, 2004.
- *2005 Selection* by IOP Select for the article [127] below.
- *2009 Selection* by IOP Select for the article [151] below.
- *First Prize* of the 2009 FQXi “The nature of Time” Community Essay Contest.
- *Fellow of the International Society of General Relativity and Gravitation*, 2010.

– *Aspen Institute Italia*, membro della sezione “Protagonisti italiani nel mondo”.

### Others

Section Editor, *Annales Henri Poincaré* (Section: quantum gravity), 2008 –

Editorial Board, *SIGMA* (Symmetry, Integrability and Geometry: Methods and Applications), 2008, –

Editorial Board, *Classical and Quantum Gravity*, 2005 –

Editorial Board, *Foundation of Physics*, 2006 –

Editorial Board, *Nuovo Cimento B*, 2005 –

Editorial Board, *The Gravitational Lens*, 2006 –

Editorial Board, *Journal of Mathematical Physics*, 1995 - 2000

Associate Editor, *General Relativity and Gravitation*, 1996 - 2006

ESA (European Space Agency). Member of the Scientific Advisory Committee (GNSS-GSAC) 2010-2012.

Steering Committee of the “Quantum Gravity and Quantum Geometry” European Science Foundation network. 2009 –

Advisory Panel, *Nature*, 2008 –

Main Organizer, International Conference “La Forma dello Spazio - Italian research on Quantum Gravity”, Trento, Italy, June 1993

Main Organizer, International Conference “Non perturbative quantum gravity”, Marseille, France, May 2004

Président “Comité d’évaluation” of the UMR 8627, Laboratoire de Physique Théorique, Orsay, France, december 2009

“Comité d’évaluation” of the UMR 7164, Laboratoire d’AstroParticules et Cosmologie, Paris, France, february 2008

“NSERC Evaluation committee” of Perimeter Institute, Toronto, Canada. 4-August 29, 2006

“Comité National” du CNRS (Centre National de la Recherche Scientifique), France, Section 02. 2004 – 2008

Nominating Committee of the International Society on General Relativity and Gravitation 2007-2013

Bergmann-Wheeler Thesis Prize committee

Scientific Committee for the conference “Quantum Gravity”, Beijing, July, 2009

Program committee for conference “Inconsistency Robustness 2011”, Stanford 2011

Program Committee of the “Sydney-Tilburg conference on Reduction and the Special Sciences”, Tilburg Center for Logic and Philosophy of Science at Tilburg University, The Netherlands, April 2008

Scientific Committee of the International Conference on Gravitation and Cosmology, ICGC-2007, Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India

Scientific Committee for the conference “Quantum Gravity and Quantum Geometry”, Nottingham June 30th-July 4th, 2008

Scientific Advisory Committee of the Loops ’07 conference, Morelia, Mexico, June 2007.

International Scientific committee, workshop “Beyond the Standard Model”, Università di Bologna, summer 2006.

International Standing Committee and International Advisory Committee of the Albert Einstein Centennial Meeting UNESCO, 2005

Scientific advisory committee, Center for gravity and relativity, University of South of China.

International Committee of the International conference “Loops and Spinfoams 2005”, Oct 10-15th, 2005, Albert Einstein Institute, Potsdam, Germany.

Scientific Committee, “Journé sur la Causalité” (“Einstein 2005”, Bordeaux)

Scientific Committee, SIGRAV (Italian General Relativity Society), 2003-

Scientific Committee, International Conference Mathematical Physics “Chelyabinsk Region”, Russia, Summer 2001.

Scientific Committee, International Conference “Constrained Dynamical Systems and Quantum Gravity I”, Dubna, Russia, July 1995

Scientific Committee, International Conference “Constrained Dynamical Systems and Quantum Gravity II”, Santa Margherita Ligure, Italy, September 1996

Scientific Committee, International Conference “Coherent States, Quantum Mechanics and Quantum Gravity”, Warsaw, Poland, August 1998

Comitato Scientifico, SIGRAV graduate school in contemporary relativity and gravitational physics, Villa Olmo, Como (Italy) 1998-present.

International Advisory Committee, “Gravity, Astrophysics and Strings at the Black Sea” Conference 2001.

Advisory Committee, Second Conference “Gravity, Astrophysics, and Strings at the Black Sea”, Kiten, June 10th - 16th, 2004.

Advisory Committee, International Workshop “Selected topics of theoretical and Modern Mathematical Physics”, Tbilisi, Georgia, July 1996

Advisory Committee, Constrained Dynamics and Quantum Gravity 99, Villasimius, Sardinia, Italy, September 14-18 1999.

Advisory Board, International Workshop Dice 2002 ,September 2002 at the cultural center Accademia dei Ravvivati in the town of Piombino (Italy).

Program Committee, 1996 International Fellows Conference Center for Philosophy of Science, Castiglioncello May 1996

Organizing Committee, International Seminar on Mathematical Cosmology March 30 - April 4, 1998, Potsdam, Germany

Editor, Special issue of the Journal of Mathematical Physics on “Quantum Geometry and Diffeomorphism Invariant Quantum Field Theory”, in collaboration with L Smolin, 1995

Lecturer, “PASI school on quantum gravity”, Morelia, Mexico, July 210

Lecturer, “Corfu school on quantum geometry”, Corfu, Grece, September 2009

Lecturer, “First quantum gravity school”, Zakopane, Poland, April 2007

Lecturer, “Italian School of Mathematical Physics”, Ravello, September 1996

Lecturer, “Karpacz XXXV Winter School of Theoretical Physics “From Cosmology to Quantum Gravity” Polanica, Poland, February 1999

Associate Fellow, Newton Institute, Cambridge UK, 1994

Conseille de Laboratoire, Centre de Physique Theorique de Luminy, 2004 –

Comité des specialistes, Commission 29, Université de Aix Marseille I

Comité des specialistes, Commission 29, Université de Aix Marseille II

Resident Fellow of the Center for the Philosophy of Science, Pittsburgh, PA

Résponsable de l’équipe de gravité quantique du Centre de Physique Théorique de Luminy.

Membre du comité scientifique du Département de Physique de l’Université de la Méditerranée.

**Referee for**

*Journals:* Nature, Physical Review Letters, Physical Review D, Physical Review A, Nuclear Physics, Physics Letters, Proceedings of the Royal Society, Journal of Mathematical Physics, Classical and Quantum Gravity, Journal of General Relativity, General Relativity and Gravitation, Gravity and Geometry, Foundations of Physics, Nuovo Cimento, Modern Physics Letters, International Journal of Modern Physics, International Journal of Theoretical Physics, Europhysics Letters, Complexity, Europhysics Letters.

*Publishers:* Oxford University Press, Chicago University Press, Birkhauser, Cambridge University Press, Elsevier Publishing Company.

*Founding Agencies:* National Science Foundation (USA), European Science Foundation (EU), European Marie Curie Networks (EU), Engineering and Physical Sciences Research Council (UK), Agence d'évaluation de la recherche et de l'enseignement supérieur (France), Science Council (Canada), Natural Sciences and Engineering Research Council (Canada), Shared Hierarchical Academic Research Computing Network (Canada), Fonds zur Förderung der Wissenschaftlichen Forschung (Austria).

### Grants

“Gravitation quantique à boucles : groupe de renormalisation et expériences”,  
ANR grant SAR 09-BLAN-0041-01 LQG-09: €280,000 (2009 - 2013)

“Collaboration Marseille-Berkeley”,  
France-Berkeley Fund: \$10,000 (2009)

“Gravitation Quantique à boucles”,  
ANR grant BLAN06-3139436: €180,000 (2006 - 2009)

“Relativité Générale”,  
Institut Universitaire de France: €76,225 (2004 - 2009)

“Relativité Générale”,  
Institut Universitaire de France: €76,225 (2010 - 2015)

“Non perturbative Quantum Gravity”,  
NSF Grant PHY-9900791: \$95,631 (1999 - 2002)

“Non perturbative Quantum Gravity”,  
NSF Grant PHY-95-15506: \$82,000 (1996 -1999)

“Non perturbative Quantum Gravity”,  
NSF Grant PHY-93-11465: \$47,000 (1993 -1995)

“Non perturbative Quantum Gravity”,  
NSF Grant PHY-90-12099: \$63,000 (1990-1993)

Physics Department of the University of Pittsburgh,  
Grant PITT 2-11225: \$6,670 (1990-1994)

“US-Italy cooperative research: Non perturbative quantum gravity”,  
NSF Grant: \$19,000 (1990-1993)

“US-Argentina cooperative research: General Relativity”  
NSF Grant: \$11,000 (1992-1993)

INFN Fellowship: Lit. 12,000,000 (1987-1988)

“La forma dello spazio”  
INFN Grant: Lit. 5,000,000 (1993)

“La forma dello spazio”  
University of Trento Grant: Lit. 4,000,000 (1993)

Research Scholarship “Fondazione della Riccia”: Lit. 5,000,000 (1987)

**Memberships**

American Physical Society

American Society for the Advancement of Science

International Society of General Relativity

Associazione Italiana di Fisica della Gravitazione e Relatività Generale

**Others**

Italian citizen and citizen of the United States of America

Spoken languages: Italian, French, English, fluent

Born in Verona, Italy, on May 3rd, 1956

Married with Adele Cesi, architetto presso l'ufficio del Ministero dei Beni Culturali per il "Patrimonio Mondiale dell'Umanità dell'UNESCO", Roma.

**Citations**

Total number of citations:  $\sim$  **7000**.

**"h" factor = 46** (*SLAC-SPIRES* database).

**"h" factor = 36** (*Isi-Web of Science* database).

## TEACHING

### Ph.D. Thesis supervised

1. Josè Balduz (Carnegie Mellon University, Pittsburgh)  
Completed November 1994  
“Dynamical Model of Quantum Measurement”
2. Hugo Morales-Tecotl (SISSA, Trieste)  
Completed August 1993  
“Fermions in the Loop Representation”  
*Hugo Morales-Tecotl is Full Professor (Profesor Titular C) at the Physics Department of the Universidad Autonoma Metropolitana Iztapalabay, Mexico city, Mexico.*
3. Junichi Iwasaki (University of Pittsburgh)  
Completed January 1994  
“The Linearization of Quantum gravity”
4. Norbert Grott (University of Pittsburgh)  
Completed April 1998  
“Moduli spaces in intersecting Knot Theory”
5. Marcelo Bareira (University of Pittsburgh).  
“Black hole emission spectra”  
*Marcelo Bareira is Assistant Professor at the Pontificia Universidade Catolica and Research Professor at Centro Universitario do Sul, Minas, Brasil.*
6. Bill Curry (University of Pittsburgh)  
“The relational interpretation of quantum mechanics”
7. Peush Upadhya (University of Pittsburgh)  
“Loop quantum gravity”
8. Alejandro Perez (University of Cordoba)  
Completed May 2001  
“Finiteness of Spin Foam models”  
*Alejandro Perez has obtained an Assistant Professor position at the Penn State University, in State College, USA. He has then obtained the position of Maitre de Conference at the Université de la Méditerranée, in Marseille, France.*
9. Marcus Gaull (Munich University)  
Completed 2001  
“Hamiltonian constraint in LQG”
10. Etera Livine (Université de la Méditerranée).  
Completed 2002  
“Modèles de mousse de spin” (Prix de Thèse 2003 de l’Université de la Méditerranée)  
*Etera Livine has a permanent CR2 (Chargé de Recherche) position at the Ecole National Supérieure de Lyon, France.*
11. Daniele Colosi (Université de la Méditerranée et Università di Roma)  
Completed Mars 2005  
“Dynamique quantique covariante”  
*Daniele Colosi has obtained a postdoctoral position at the University of Morelia, Mexico.*

12. Luisa Doplicher (Università di Roma)  
Completed February 2005  
“Teoria dei campi quantistica covariante”  
*Luisa Doplicher has obtained a postdoctoral position at the Sissa, Trieste, Italy.*
13. Florian Conrady (Berlin University)  
Completed September 2005  
“The classical limit of spin foam models”  
*Florian Conrady has obtained a postdoctoral position at Penn State University, State College, USA.*
14. Simone Speziale (Università di Roma)  
Completed January 2006  
“2d Quantum Gravity”  
*Simone Speziale has a permanent CR2 (Chargé de Recherche) position at CNRS, France.*
15. Winston Fairbairn (Université de la Méditerranée)  
Completed November 27, 2006  
“Separability in LQG” (Prix de Thèse 2007 de l’Université de la Méditerranée)  
*Winston Fairbairn has obtained a postdoctoral position in Nottingham, UK.*
16. Mauricio Mondragon Lopez (Université de la Méditerranée)  
Completed March 2008  
“Probability in relativistic quantum mechanics”
17. Emanuele Alesci (Università di Roma III)  
Completed January 2008  
“Scattering amplitudes in LQG”
18. Elena Magliaro (Università di Roma III)  
Completed January 2009  
“Feynman rules in quantum gravity”
19. Claudio Perini (Università di Roma)  
“Feynman rules in quantum gravity”
20. Roberto Pereira (Université de la Méditerranée)  
“The loop quantum gravity vertex”
21. Valentin Bonzom (Université de la Méditerranée)  
“Spifoam models”
22. Matteo Smerlak (Université de la Méditerranée)  
“Renormalization in quantum gravity”
23. You Ding (Université de la Méditerranée)  
“LQG vertex and hamiltonian”
24. Francesca Vidotto (Università di Pavia)  
“Loop Quantum Gravity and Cosmology”

#### **Other thesis supervised**

1. Alexandru, Mustatea, Master (Université de la Méditerranée),  
“Quantum geometry”

2. Bernard Raffaelli (Université de la Méditerranée, Marseille), DEA.  
“Quantum Gravity”
3. David Louapre (ENS, Lyon) DEA.  
“Gravité Quantique en 3d”
4. Simone Speziale (Università di Roma) Laurea  
“Reconcile Planck-scale discreteness and the Lorentz-Fitzgerald contraction”
5. Frank Hellmann (Munich University) Diploma Thesis  
“Eigenvalues in relativistic quantum mechanics”
6. Francesca Vidotto (Università di Padova) Laurea  
“Loop quantum cosmology. Curved models and inhomogeneities.”

### Jury

1. Habilitation à diriger des recherches : Alejandro Perez, Marseille 21/2/2006.
2. Habilitation à diriger des recherches (Cosmologie) :
3. Habilitation à diriger des recherches (Philosophie) : Charles Alunni, ENS Paris, 2002.
4. Doctorat (Philosophie) : Alexiei Grinbaum, Polytechnique Paris, 2002.
5. Doctorat : David Louapre, ENS Lyon, 2003.

### Courses taught

1. General Relativity 1 (USA, Graduate)
2. General Relativity 2 (USA, Graduate)
3. Classical and Quantum Canonical General Relativity (USA, Graduate)
4. Cosmology (USA, Graduate)
5. Astronomy (USA, Undergraduate)
6. Introductory Quantum Mechanics (USA, Undergraduate)
7. Introductory Physics for Scientists and Engineers 1 (USA, Undergraduate)
8. Introductory Physics for Scientists and Engineers 2 (USA, Undergraduate)
9. Introductory Physics for Scientists and Engineers 3 (USA, Undergraduate)
10. Introductory Physics for non science majors 1 (USA, Undergraduate)
11. Introductory Physics for non science majors 2 (USA, Undergraduate)
12. Physics of Music (USA, Undergraduate)
13. Meccanica Razionale (Italy)
14. Introduction à la Mécanique Quantique (France, DEUG)
15. Relativité générale (France, Maitrise)
16. Mécanique Quantique (France, License)
17. Optique Géométrique (France, Deug)
18. La Naissance de la Science (France, License)

### Introduction and development of new courses

1. La Naissance de la Science (France, License)  
*New undergraduate cours proposed and developed at the Université de la Méditerranée. Started winter 2005. 130 students.*

## POPULARIZATION

### Books

1. C Rovelli: "Cos'è il tempo? Cos'è lo spazio?", DiRenzo editore, Roma 2004.
2. C Rovelli: "Qu'est ce que le temps ? Qu'est ce que l'espace ?", Bernard Gilson, Bruxelles 2006.
3. C Rovelli: "What is Time? What is Space?", English translation by J.C. van den Berg, DiRenzo editore, Roma 2006.
4. C Rovelli: "Anaximandre de Milet ou la naissance de la science", French translation by Matteo Smerlak, Dunot, Paris, 2009.

### Radio

1. "Anaximander"  
Radio Canada. February 2010.
2. "Science et emergence"  
France Culture. February 2008.
3. "La Science et ses représentations"  
France Culture. 15 heures, 3 fois. September 2003.
4. "Le oche della scienza"  
Radio 24. Interview on Time in Physics. July 2004.
5. "La Natura della Scienza"  
Radio3Scienza. Interview on the Nature of Science. January 2009.

### CD

1. "Interview avec Claude Cohen-Tannoudji"  
De Vive Voix, Paris 2005.
2. "Temps et espace: d'Anaximandre à la gravité quantique"  
De Vive Voix, Paris 2007.

### Internet

1. "L'Univers est-il accessible à nos sens?"  
Universcience.tv. Le Dèbat et vice-versa  
<http://www.universcience.tv//index.php/numero/52>
2. "La parole aux chercheurs. Interview"  
ARTE science  
[http://www.arte-tv.com/fr/connaissance-decouverte/science/Paroles\\_20de\\_20chercheur/Carlo\\_20Rovelli/1232260.html](http://www.arte-tv.com/fr/connaissance-decouverte/science/Paroles_20de_20chercheur/Carlo_20Rovelli/1232260.html)

### Popular lectures

1. "What is space? What is time? Quantum gravity and the beginning of the universe", Beijing, august 2009.
2. "La luna e la scienza", Festival delle letterature, Roma, mai 2009.
3. "Spazio, tempo e gravità quantistica", Conferenza pubblica, Aula Magna dell'Università di Bologna, December 4th, 2005.
4. "Spazio e tempo prima e dopo Einstein", Lezione Galileana, Università di Firenze, October 3rd 2005.

5. “La gravité quantique : quand l’espace et le temps n’existent plus”, Cycle “Einstein et sa posterité”, Cité de la Science, Paris, Mars 19, 2005.
6. “Qu’est ce que l’espace ? Qu’est ce que le temps ? La fin des nos certitudes newtoniennes”, Echange et Diffusion des Savoirs, Marseille, 10 mars 2005
7. “Nature de l’espace temps”, Le Siècle d’A. Einstein - A. Einstein’s Century, Colloque Grande Public, July 11-15, 2005, Paris 2005.

#### Encyclopaedias

1. *Enciclopedia Treccani*, Millennium update, article “Gravità quantistica”.
2. *Encyclopaedia Britannica*, 1991 Yearbook of Science and Technology, article “Knots and Physics”.
3. *The Stanford Encyclopedia of Philosophy*, Edward N. Zalta (ed.), URL = <http://plato.stanford.edu/archives/win2003/entries/rovelli/> entry “Relational quantum mechanics”.
4. *Handbook of the Philosophy of Science*. Volume 2: Philosophy of Physics Volume editors: John Earman and Jeremy Butterfield. Handbook editors: Dov M. Gabbay, Paul Thagard and John Woods, entry “Quantum Gravity” (Elsevier, 2006)
5. *Encyclopedia of Mathematical Physics*, eds. J.-P. Francoise, G.L. Naber and Tsou S.T. Oxford: Elsevier, 2006 (ISBN 978-0-1251-2666-3), entry “Loop Quantum Gravity”, volume 3 page 339.
6. *Encyclopedia of Mathematical Physics*, eds. J.-P. Francoise, G.L. Naber and Tsou S.T. Oxford: Elsevier, 2006 (ISBN 978-0-1251-2666-3), entry “Canonical general relativity”, volume 1 page p. 412.
7. *La Scienza*, Edizioni La Repubblica, Roma 2005, entry “Spazio e Tempo”.

#### Some popularization articles on my work, or by myself

1. “S’affranchir du temps”, C Rovelli, Pour la Science, October 2010.
2. *Il Sole 24 Ore*, *supplemento cultura domenicale*, “Dante e Einstein nella tre-sfera”, C Rovelli, October 2010.
3. *La Recherche*, “Oubliez le temps”, C Rovelli, dossier, June 2010.
4. *La Recherche*, “Mécanique quantique, un question de perspective”, M Smerkal and C Rovelli, April 2008.
5. *The Daily Telegraph*, “On the third stroke, time will be a-changin’”, Roger Highfield, February 2008.
6. *Discover*, “Does Time Exist?”, T Folger, June 2007.
7. *Physics Today*, “Quantum Gravity Faces Reality”, L Smolin, November 2006.
8. *Science et Avenir*, *Hors-Série*, “Le pile et face quantique”, M Bitbol, October/November 2006.
9. *Ciel et espace*, *Hors-Série*, “Chercher c’est reconnaitre que nous ne savons presque rien”, October 2006.
10. *Il Sole 24 ore*, “Stringhe che non tengono”, C Rovelli, October, 2006.
11. *The Economist*, “Looping the loop”, September 30th, 2006.
12. *New Scientist*, “Supersizing quantum gravity” Cover page and article, D Castelvecchi, August 2006.
13. *Spektrum Wissenschaft*, “Fluch und Segen spekulativer Theorien” (“Curse and benediction of speculative theories”), C Rovelli, 2006N3 108, 2006.
14. *Science et Vie*, “Le monde existe-t-il vraiment?”, cover page and feature article, Octobre 2005.
15. *Science et Vie*, “Qu’y avait-il avant le Big Bang?”, cover page and feature article, Juillet 2005.

16. *Science et Vie*, “Depasser Einstein”, cover page and feature article, April 2005.
17. *Le Scienze*, “Universo, parte seconda”, Cristina Valsecchi, June 2005.
18. *Science et Vie*, “Depasser Einstein”, cover page and feature article, April 2005.
19. *Scientific American*, “Grains of Space”, Lee Smolin, January 2004.
20. *Physics World*, “Loop Quantum Gravity”, C Rovelli, November 2003.
21. *Science Magazine*, “Constructing Spacetime—No Strings Attached”, Adrian Cho, 8-11-2002.
22. *Science Magazine*, “The beginning of time”, Greg Hogan, 3-22-2002.
23. *International Herald Tribune*, “Turn Down That Web, These Scientists Plead, So We Can Think”, James Glanz, 6-20-2001.
24. *The New York Times*, “How is the Universe built? Grain by Grain”, George Johnson, 12-7-1999.
25. *Science News*, “Loops of Gravity: calculating a foamy quantum spacetime”, Ivars Peterson, 6-13-1998.
26. *Discover*, “Beyond Einstein: Is Space Loopy?”, Marcia Bartusiak, April 1993.

Science fiction books making extensive reference to my scientific work

1. *Blue Mars*, by Kim Stanley Robinson (Bantam, New York, 1996.)
2. *Schild Ladder*, by Greg Egan (Gollancz, London 2001.)

## SCIENTIFIC PUBLICATIONS

### Books

1. C Rovelli: *Quantum Gravity*, Cambridge University Press, 2004.  
Available online at <http://www.cpt.univ-mrs.fr/~rovelli/book.pdf>

### Articles

1. C Rovelli: "Ghosts in Gravity theories with a scalar field", *Il Nuovo Cimento* 78B, 167 (1983)
2. C Rovelli: "Constraint algebra in General Relativity", *Il Nuovo Cimento* 92B, 49 (1986)
3. C Rovelli: "Anomalies in quantum gravity", *Physics Letters* B187, 88 (1987)
4. C Rovelli: "Quantization of the 'single point gravity' hamiltonian system", *Physics Review* D35, 2987 (1987)
5. C Rovelli: "Group quantization of constrained systems", *Il Nuovo Cimento* B 100, 343 (1988)
6. C Rovelli and L Smolin: "Knot theory and quantum gravity", *Physical Review Letters* 61, 1155 (1988)
7. C Rovelli: "Loop space representation", In: "New perspectives in canonical gravity", A Ashtekar Bibliopolis, Naples 1988
8. C Rovelli: "General relativity in the fixed volume gauge", *Classical and Quantum Gravity* 6, 911 (1989)
9. A Ashtekar, V Husain, J Samuel, C Rovelli, L Smolin: "2+1 quantum gravity as a toy model for the 3+1 theory", *Classical and Quantum Gravity* 6, L185 (1989)
10. C Rovelli, L Smolin: "Loop space representation for quantum general relativity", *Nuclear Physics* B331, 80 (1990)
11. C Rovelli: "What is observable in classical and quantum gravity?", *Classical and Quantum Gravity* 8, 297 (1991)
12. C Rovelli: "Quantum reference systems", *Classical and Quantum Gravity* 8, 317 (1991)
13. C Rovelli: "Quantum mechanics without time: a model", *Physical Review* D42, 2638 (1991)
14. C Rovelli: "Time in quantum gravity: an hypothesis", *Physical Review* D43, 442 (1991)
15. C Rovelli: "Ashtekar formulation of general relativity and loop space non-perturbative Quantum Gravity: a report", Invited review paper. *Classical and Quantum Gravity*, 8, 1613-1675 (1991)
16. A Ashtekar, C Rovelli, L Smolin: "Gravitons and loops", *Physical Review* D44, 1740 (1991)
17. C Rovelli: "Quantum evolving constants", *Physical Review* D44, 1339 (1991)
18. C Kozameh, T Newman, C Rovelli: "On Radiation in a massive Schwarzschild background", *Physical Review* D44, 551 (1991)
19. J Goldberg, T Newman, C Rovelli: "On Hamiltonian systems with first class constraints", *Journal of Mathematical Physics* 32, 2739-2743 (1991)
20. D Boyanowski, T Newman, C Rovelli: "Quantization of dynamical systems with a Chern-Simon term", *Physical Review* D45, 1210 (1992)
21. C Rovelli: "Knot theory and spacetime", Feature Article in the 1992 edition of the "Year-Book of Science and Technology" of the *Encyclopedia Britannica*
22. A Ashtekar, C Rovelli: "Connections, loops and quantum general relativity", *Classical and Quantum Gravity* 9, 3 (1992)
23. A Ashtekar, C Rovelli: "Loop representation of Maxwell field", *Classical and Quantum Gravity* 9, 1121 (1992)
24. A Ashtekar, C Rovelli, L Smolin: "Self duality and quantization", *Journal of Geometry and Physics* 8, 7 (1992)
25. A Ashtekar, C Rovelli, L Smolin: "Weaving a classical metric with quantum threads", *Physical Review Letters* 69, 237 (1992)
26. ET Newman, C Rovelli: "Generalized lines of force as the gauge invariant degrees of freedom for general relativity and Yang-Mills theory", *Physical Review Letters* 69, 1300 (1992)

27. C Rovelli: “Area is the length of Ashtekar’s triad field”, *Physical Review D* 47, 1703 (1993)
28. J Iwasaki, C Rovelli: “Gravitons as Embroidery on the Weave”, *International Journal of Modern Physics D* 1, 533 (1993)
29. C Rovelli: “Statistical mechanics of gravity and thermodynamical origin of time”, *Classical and Quantum Gravity*, 10, 1549 (1993)
30. C Rovelli: “The statistical state of the universe”, *Classical and Quantum Gravity*, 10, pg 1567 (1993)
31. C Rovelli: “A generally covariant quantum field theory and a prediction on quantum measurements of geometry”, *Nuclear Physics B* 405, 797 (1993).
32. C Rovelli: “Basis of the Ponzano-Regge-Turaev-Viro-Ooguri quantum gravity model is the loop representation basis”, *Physical Review D* 48, 2702 (1993)
33. J Lewandowski, ET Newman, C Rovelli: “Variation of the parallel propagator and holonomy operator and the Gauss law constraint”, *Journal of Mathematical Physics* 34, 4646 (1993)
34. C Rovelli and L Smolin: “The physical hamiltonian in nonperturbative quantum gravity”, *Physical Review Letters* 72, 446 (1994)
35. H Morales-Tecotl, C Rovelli: “Fermions in Quantum Gravity”, *Physical Review Letters* 72, 3642 (1994)
36. A Connes and C Rovelli: “Von Neumann algebra automorphisms and time versus thermodynamics relation in general covariant quantum theories”, *Classical and Quantum Gravity*, 11, 2899 (1994)
37. J Iwasaki, C Rovelli: “Gravitons from loops: non-perturbative loop-space quantum gravity contains the graviton-physics approximation”, *Classical and Quantum Gravity* 11, 1653 (1994)
38. C Rovelli: “Comment on ‘The meaning of the wave function’ ”, *Physical Review A*, 50 (1994) 2788
39. S Frittelli, S Koshti, T Newman, C Rovelli: “Classical and quantum dynamics of the Faraday lines of force”, *Physical Review D* 49 (1994) 6883
40. C Rovelli: “Analysis of the different meaning of the concept of time in different physical theories”, *Il Nuovo Cimento* 110B, 81 (1995)
41. R DePietri and C Rovelli: “Eigenvalues of the Weyl operator as observables in General Relativity”, *Classical and Quantum Gravity* 12, 1279 (1995)
42. C Bicchieri and C Rovelli: “Evolution and Revolution; catastrophe theory and the dynamics of norms”, *Rationality and Society* 7, 201 (1995)
43. C Rovelli and L Smolin: “Discreteness of Area and Volume in Quantum Gravity”, *Nuclear Physics B* 442, 593 (1995). Erratum: *Nuclear Physics B* 456, 753 (1995)
44. C Rovelli: “Outline of a General Covariant Quantum Field Theory and a Quantum Theory of Gravity”, *Journal of Mathematical Physics* 36, 6529 (1995). Paper awarded by a honorable mention from the Gravity Research Foundation.
45. H Morales-Tecotl and C Rovelli: “Loop space representation of quantum fermions and gravity”, *Nuclear Physics B* 451, 325 (1995)
46. C Rovelli and L Smolin: “Spin Networks and Quantum Gravity”, *Physical Review D* 53, 5743 (1995); gr-qc/9505006
47. N Grott and C Rovelli: “Moduli spaces structure of knots with intersections”, *Journal of Mathematical Physics*, 37, 3014 (1996)
48. C Rovelli: “Relational Quantum Mechanics”, *International Journal of Theoretical Physics*, 35, 1637 (1996)
49. R DePietri and C Rovelli: “Geometry Eigenvalues and Scalar Product from Recoupling Theory in Loop Quantum Gravity”, *Physical Review D* 54 (1996) 2664
50. C Bicchieri, ME Pollack, C Rovelli, I Tsamardinos: “The Potential for Evolution of Cooperation among Web Agents”, *International Journal of Human-Computer Studies*, 48 (1998) 9-29.
51. M Barreira, M Carfora, C Rovelli: “Physics with Loop Quantum Gravity: Radiation from Quantum Black Hole”, *General Relativity and Gravitation*, 28 (1996) 1293. Second Award of the Gravity Research Foundation, 1996; gr-qc/9603064

52. N Grott, C Rovelli and RS Tate: "Time-of-arrival in quantum mechanics", *Physical Review A* 54 (1996) 4679; quant-ph/9603021
53. S Frittelli, L Lehner, C Rovelli: "The complete spectrum of the area from recoupling theory in loop quantum gravity", *Classical and Quantum Gravity*, 13 (1996) 2921.
54. C Rovelli: "Loop Quantum Gravity and Black Hole Physics", *Helvetica Physica Acta*, 69 (1996) 582; gr-qc/9608032
55. C Rovelli: "Half way through the woods", in *The Cosmos of Science*, J Earman and JD Norton editors, (University of Pittsburgh Press and Universitäts Verlag Konstanz, 1997).
56. S Frittelli, C Kozameh, ET Newman, C Rovelli and RS Tate: "Fuzzy spacetime points from the null-surface formulation of general relativity", *Classical and Quantum Gravity*, 14 (1997) A143
57. N Grott, C Rovelli: "Weave states in loop quantum gravity", *General Relativity and Gravitation*, 29 (1997) 1039.
58. C Rovelli: "Quantum gravity as a 'sum over surfaces' ", *Nuclear Physics (Proc Suppl)* 57 (1997) 28-43.
59. M Reisenberger, C Rovelli: "Sum over Surfaces Form of Loop Quantum Gravity", *Physical Review D* 56 (1997) 3490-3508; gr-qc/9612035
60. C Rovelli: "Black Hole Entropy from Loop Quantum Gravity", *Physical Review Letter* 14, pg 3288 (1996).
61. S Frittelli, C Kozameh, ET Newman, C Rovelli and RS Tate: "Quantization of the null-surface formulation of general relativity", *Physical Review D* 56 (1997) 889-907
62. G Landi, C Rovelli: "General Relativity in terms of Dirac Eigenvalues", *Physical Review Letters*, 78 (1997) 3051; gr-qc/9612034
63. R Borissov, R DePietri, C Rovelli: "Matrix elements of Thiemann hamiltonian", *Classical and Quantum Gravity* 14 (1997) 2793; gr-qc/97703090
64. C Rovelli, T Thiemann: "The Immirzi parameter in quantum general relativity", *Physical Review D* 57 (1998) 1009-1014; gr-qc/9705059.
65. C Rovelli: "Loop Quantum Gravity", *Living Reviews in Relativity* (refereed electronic journal), invited review paper. <http://www.livingreviews.org/Articles/Volume1/1998-1rovelli;gr-qc/9709008>.
66. C Rovelli: " 'Incerto tempore, incertisque loci' : Can we compute the exact time at which the quantum measurement happens?", *Foundations of Physics*, 28 (1998) 1031-1043; quant-ph/9802020
67. G Landi, C Rovelli: "Gravity from Dirac Eigenvalues", *Modern Physics Letters A* 13 (1998) 479-494; gr-qc/9708041
68. C Rovelli: "What is a gauge transformation in quantum mechanics?", *Physical Review Letters* 80 (1998) 4613; gr-qc/9711028
69. C Rovelli: "Strings, loops and others: a critical survey of the present approaches to quantum gravity", in *Gravitation and Relativity: At the turn of the Millenium*, N Dadhich J Narlikar eds, pg 281-331 (Inter-University centre for Astronomy and Astrophysics, Pune 1998); gr-qc/9803024.
70. M Montesinos, C Rovelli: "The fermionic contribution to the spectrum of the area operator in nonperturbative quantum gravity", *Classical and Quantum Gravity*, 15 (1998) 3795-3801; gr-qc/9806120.
71. C Rovelli and P Upadhy: "Loop quantum gravity and quanta of space: a primer", gr-qc/9806079.
72. C Rovelli: "The projector on physical states in loop quantum gravity", *Physical Review D* 59 (1999) 104015; gr-qc/9806121.
73. M Montesinos, C Rovelli and T Thiemann: "An  $SL(2, R)$  model of constrained systems with two hamiltonian constraints", *Physical Review D* 60 (1999) 044009; gr-qc/9901073.
74. C Rovelli: "Quantum Spacetime: what do we know?", in *Physics meets Philosophy at the Planck length*, C Callender N Hugget eds, Cambridge University Press 1999; gr-qc/9903045.
75. C Rovelli: "Erratum: What is a gauge transformation in quantum mechanics?", *Physical Review Letters* 81 (1998) 4530.

76. C Rovelli: “Spectral noncommutative geometry and quantization: a simple example”, gr-qc/9904029.
77. J Louko, C Rovelli: “Refined Algebraic Quantization in the oscillator representation of  $SL(2, \mathbb{R})$ ”, *Journal of Mathematical Physics* 41 (2000) 132-155; gr-qc/9907004.
78. C Rovelli: “Spectral noncommutative geometry and quantization”, *Physical Review Letters*, 83 (1999) 1079.
79. R DePietri, L Freidel, K Krasnov, C Rovelli: “Barret-Crane model from a Boulatov-Ooguri field theory over a homogeneous space”, *Nucl Phys B* 574 (2000) 785-806; hep-th/9907154.
80. C Rovelli: “The century of the incomplete revolution: searching for general relativistic quantum field theory”, *Journal of Mathematical Physics* 41, Special Issue 2000, invited contribution, 3776 (2000); hep-th/9910131.
81. C Rovelli: “Notes for a Brief History of Quantum Gravity”, in *Proceedings of the ninth Marcel Grossmann Meeting on General Relativity* R.T. Jantzen, R. Ruffini, V. G. Gurzadyan editors pages 742-768 (World Scientific, Singapore 2002)
82. M Gaul, C Rovelli: “Loop Quantum Gravity and the Meaning of Diffeomorphism Invariance”, *Lecture Notes in Physics* 541 (2000) 277-324; gr-qc/9910079.
83. M Montesinos, C Rovelli: “Statistical mechanics of generally covariant quantum theories: A Boltzmann-like approach”, *Classical and Quantum Gravity* 18 (2001) 555-569; gr-qc/0002024.
84. M Reisenberger, C Rovelli: “Spinfoams as Feynman diagrams”, in *2001 A Relativistic Space-time Odyssey* I. Ciufolini, D. Dominici, L. Lusanna eds. pp 431-48 (World Scientific, Singapore 2003); gr-qc/0002083.
85. M Reisenberger, C Rovelli: “Spacetime as a Feynmann diagram: the connection formulation”, *Class Quantum Grav* 18 (2001) 121-140; gr-qc/0002095.
86. A Perez, C Rovelli: “A spin foam model without bubble divergences”, *Nuclear Physics B* 599 (2001) 255-282; gr-qc/0006107.
87. A Perez, C Rovelli: “Spin foam model for Lorentzian General Relativity”, *Physical Review D* 63 (2001) 041501
88. A Perez, C Rovelli: “3+1 spinfoam model of quantum gravity with spacelike and timelike components”, *Physical Review D* 64 (2001) 064002
89. M Gaul, C Rovelli: “A generalized Hamiltonian Constraint Operator in Loop Quantum Gravity and its simplest Euclidean Matrix Elements”, *Class and Quant Grav* 18 (2001) 1593-1624; gr-qc/0011106.
90. L Crane, A Perez, C Rovelli: “A finiteness proof for the Lorentzian state sum spinfoam model for quantum general relativity”, gr-qc/0101088.
91. A Perez, C Rovelli: “Observables in quantum gravity”, gr-qc/0104034.
92. R Livine, A Perez, C Rovelli: “2d manifold-independent spinfoam theory”, *Classical and Quantum Gravity* 20, 4103-4123; gr-qc/0102051.
93. C Rovelli: “Partial observables”, *Physical Review D* 65 (2002) 124013
94. C Rovelli: “A note on the foundation of relativistic mechanics. I: Relativistic observables and relativistic states”, *Proceedings of the 15th SIGRAV Conference on General Relativity and Gravitational Physics, Rome, September 2002*; gr-qc/0111037.
95. C Rovelli: “GPS observables in general relativity”, *Physical Review D* 65 (2002) 044017
96. M Reisenberger, C Rovelli: “Spacetime states and covariant quantum theory”, *Physical Review D* 65 (2002) 125016; gr-qc/0111016
97. L Crane, A Perez, C Rovelli: “Finiteness in spinfoam quantum gravity”, *Physical Review Letters* 87 (2001) 181301
98. D Marolf, C Rovelli: “Relativistic quantum measurement”, *Physical Review D* 66 (2002) 023510; gr-qc/0203056
99. C Rovelli: “A note on the foundation of relativistic mechanics. II: Covariant hamiltonian general relativity”, in *Topics in Mathematical Physics, General Relativity and Cosmology*, H Garcia-Compean, B Mielnik, M Montesinos, M Przanowski editors, pg 397, (World Scientific, Singapore 2006); gr-qc/0202079
100. C Rovelli: “Dynamics without time for quantum gravity: Covariant hamiltonian formalism for field theory and Hamilton-Jacobi equation on the space  $G$ ”, in *Decoherence and Entropy*

- in Complex Systems. Selected lectures from DICE 2002*, HT Elze ed, Lecture Notes in Physics Lecture Notes in Physics 633 (2003) 36-62 (Springer, Berlin 2003); gr-qc/0207043
101. C Rovelli, S Speziale: "Reconcile Planck-scale discreteness and the Lorentz-Fitzgerald contraction", Physical Review D67 (2003) 064019; gr-qc/0205108
  102. P Martinetti, C Rovelli: "Diamonds's Temperature: Unruh effect for bounded trajectories and thermal time hypothesis", Classical and Quantum Gravity (2003) 4919-4932; gr-qc/0212074
  103. L Freidel, R Livine, C Rovelli: "Spectra of Length and Area in 2+1 Lorentzian Loop Quantum Gravity", Classical and Quantum Gravity 20 (2003) 1463-1478; gr-qc/0212077
  104. F Conrady, L Doplicher, R Oeckl, C Rovelli, M Testa: "Minkowski vacuum in background independent quantum gravity", Physical Review D69 (2004) 064019; gr-qc/0307118
  105. D Colosi, C Rovelli: "A simple background-independent hamiltonian quantum model", Physical Review D68 (2003) 104008; gr-qc/0306059
  106. C Rovelli: "Loop quantum gravity", Phys World 16N11 (2003) 37
  107. F Conrady, C Rovelli: "Generalized Schrödinger equation in Euclidean field theory", International Journal of Modern Physics A 19, (2004) 4037; hep-th/0310246
  108. C Rovelli: "A dialog on quantum gravity", International Journal of Modern Physics, D12 (2003) 1509-1528; hep-th/0310077
  109. C Rovelli: "Comment on 'Causality and the Arrow of Classical Time' by F Rorhich", Studies in History and Philosophy of Modern Physics, 35/3 (2004) 397-405
  110. W Fairbairn, C Rovelli: "Separable Hilbert space in loop quantum gravity", Journal of Mathematical Physics, 45 (2004) 2802-2814
  111. C Rovelli: "Relational quantum theory", in *Quo Vadis Quantum Mechanics?*, N Kolenda, A Elitzur editors, (Springer-Verlag, Berlin, 2004)
  112. D Oriti, C Rovelli, S Speziale: "Spinfoam 2d quantum gravity and discrete bundles", Class Quantum Grav 22 (2005) 85-108; gr-qc/0406063
  113. D Colosi, L Doplicher, W Fairbairn, L Modesto, K Noui, C Rovelli: "Background independence in a nutshell", Class Quantum Grav 22 (2005) 2971-2989; gr-qc/0408079
  114. T Jacobson, D Marolf, C Rovelli: "Black hole entropy: inside or out?", Int J Theor Phys 44 (2005) 1807-1837 hep-th/0501103
  115. G 't Hooft, L Susskind, E Witten, M Fukugita, L Randall, L Smolin, J Stachel, C Rovelli, G Ellis, S Weinberg, R Penrose: "A theory of everything?" Nature, 433 (2005) 257-259
  116. L Modesto, C Rovelli: "Particle scattering in loop quantum gravity", Physical Review Letters, 95 (2005) 191301, gr-qc/0502036
  117. F Mattei, C Rovelli, S Speziale, M Testa: "From 3-geometry transition amplitudes to graviton states", Nucl. Phys. B739 (2006) 234 [arXiv:gr-qc/0508007].
  118. A Perez, C Rovelli: "Physical effects of the Immirzi parameter", Phys Rev D 73 (2006) 044013; gr-qc/0505081
  119. S Speziale, C Rovelli: "On the perturbative expansion of a quantum field theory around a topological sector", General Relativity and Gravitation, 39:167-178,2007, gr-qc/0508106
  120. C Rovelli: "Graviton propagator from background-independent quantum gravity", Phys Rev Lett 97 (2006) 151301; gr-qc/0508124
  121. C Rovelli: "The disappearance of Space and Time", in *The Ontology of Spacetime* D. Dieks (Editor) (Elsevier 2006)
  122. C Rovelli: "Loop Quantum Gravity", in *Encyclopedia of Mathematical Physics*, eds. J.-P. Francoise, G.L. Naber and Tsou S.T. Oxford: Elsevier, 2006, volume 3 page 339
  123. C Rovelli: "Canonical general relativity", in *Encyclopedia of Mathematical Physics*, eds. J.-P. Francoise, G.L. Naber and Tsou S.T. Oxford: Elsevier, 2006, volume 1 page p. 412
  124. C Rovelli: "Quantum Gravity", in *Handbook of the Philosophy of Science. Volume 2: Philosophy of Physics* Volume editors: John Earman and Jeremy Butterfield. Handbook editors: Dov M. Gabbay, Paul Thagard and John Woods. 2006 Elsevier BV
  125. C Rovelli: "The disappearance of Space and Time", in *Philosophy and Foundations of Physics. The Ontology of Spacetime* D. Dieks (Editor) 2006 Elsevier B.V.
  126. E Bianchi, L Modesto, C Rovelli, S Speziale: "Graviton propagator in loop quantum gravity", Classical and Quantum Gravity 23 (2006) 6989-7028; (Article Selected by IOP Select). gr-qc/0604044

127. C Rovelli: “Unfinished revolution”, Introductory chapter of a book on Quantum Gravity, edited by Daniele Oriti, to appear with Cambridge University Press , gr-qc/0604045
128. M Smerlak, C Rovelli: “Relational EPR”, Foundations of Physics 37:427-445,2007, quant-ph/0604064
129. C Rovelli, S Speziale: “A semiclassical tetrahedron”, Classical and Quantum Gravity 23:5861-5870 (2006), gr-qc/0606074
130. F Hellmann, M Mondragon, A Perez, C Rovelli: “Multiple-event probability in general-relativistic quantum mechanics”, Physical Review D 75, 084033 (2007). gr-qc/0610140
131. L Fatibene, M Francaviglia, C Rovelli: “On a Covariant Formulation of the Barbero-Immirzi Connection”, Classical and Quantum Gravity 24 (2007) 3055-3066; gr-qc/0702134
132. E Magliaro, C Perini, C Rovelli: “Compatibility of radial, Lorenz and harmonic gauges”, Physical Review D76 : 084013, 2007; arXiv:0704.0992
133. M Mondragon, A Perez, C Rovelli: “Multiple-event probability in general-relativistic quantum mechanics: a discrete model”, Physical Review D 76 (2007) 064005; arXiv:0705.0006
134. J Engle, R Pereira, C Rovelli: “The loop-quantum-gravity vertex-amplitude”, Physical Review Letters, 99 (2007) 161301; arXiv:0705.2388
135. L Fatibene, M Francaviglia, C Rovelli: “Spacetime Lagrangian Formulation of Barbero-Immirzi Gravity”, Class. Quantum Grav. 24 (2007) 4207-4217, arXiv:0706.1899
136. C Rovelli: “Beyond the screen of time”, Nature, Physics, 3 (2007)
137. C Rovelli: “Book review of ‘The Structural Foundations of Quantum Gravity’ by D Rickles, S French and J Saatsi (Eds.)”, Class. Quantum Grav. 24 (2007) 4539-4541. <http://stacks.iop.org/0264-9381/24/4539>.
138. E Alesci, C Rovelli: “The complete LQG propagator: I. Difficulties with the Barrett-Crane vertex”, Physical Review D76 (2007) 104012; arXiv:0708.0883
139. J Engle, R Pereira, C Rovelli: “Flipped spinfoam vertex and loop gravity”, Nuclear Physics, 798 (2008) 251-290; arXiv:0708.1236
140. C Rovelli: “Comment on ‘Are the spectra of geometrical operators in Loop Quantum Gravity really discrete?’ by B. Dittrich and T. Thiemann”, arXiv:0708.2481.
141. E Magliaro, C Perini, C Rovelli: “Numerical indications on the semiclassical limit of the flipped vertex”; Class. Quant. Grav. 25: 095009, 2008. arXiv:0710.5034.
142. E Alesci, C Rovelli: “Complete LQG propagator. II. Asymptotic behavior of the vertex”, Physical Review D77 (2008) 044024; arXiv:0711.1284
143. J Engle, E Livine, R Pereira, C Rovelli: “LQG vertex with finite Immirzi parameter” Nuclear Physics B799:136-149,2008; arXiv:0711.0146
144. C Rovelli: “Quantum gravity”, Scholarpedia, 3(5) (2008) 7117, [http://www.scholarpedia.org/article/Quantum\\_gravity](http://www.scholarpedia.org/article/Quantum_gravity)
145. F Vidotto, C Rovelli: “Stepping out of homogeneity in Loop Quantum Cosmology”, Class. Quantum Grav. 25 (2008) 225024; arXiv:0805.4585
146. C Rovelli: “A note on DSR”, arXiv:0808.3505
147. C Rovelli: “Qu’est-ce que le temps ? La fin de nos certitudes newtoniennes”, in *Lexiques de l’incertain*, S Théodoru ed, (Parenthèses éditions, Marseille 2008)
148. C Perini, C Rovelli, S Speziale: “Self-energy and vertex radiative corrections in LQG”, arXiv:0810.1714, Physics Letters B 682 (2009) 78–84. Journal online version <http://dx.doi.org/10.1016/j.physletb.2009.10.076>
149. C Rovelli, “Loop quantum gravity”, Living Rev.Rel.11:5,2008.
150. E Alesci, E Bianchi, C Rovelli, “LQG propagator: III. The new vertex” Class. Quantum Grav. 26 (2009) 215001; arXiv:0812.5018 [gr-qc]
151. D Colosi, C Rovelli: “What is a particle?”, Class. Quantum Grav. 26 (21 January 2009) 025002. gr-qc/0409054. (Article Selected by IOP Select).
152. C Rovelli: “ ‘Forget Time’ ”, arXiv:0903.3832, First Community Prize of the FQXi “The nature of Time” Essay Contest.
153. D Mamone, C Rovelli: “Second-order amplitudes in loop quantum gravity”, Class. Quantum Grav. 26 (2009) 245013. arXiv:0904.3730 [gr-qc]

154. C Rovelli, F Vidotto: “Single particle in quantum gravity and BGS entropy of a spin network”, Phys. Rev. D81 (2010) 044038. arXiv:0905.2983.
155. K Krasnov, C Rovelli: “Black holes in full quantum gravity”, Class. Quantum Grav. 26 (2009) 245009, arXiv:0905.4916
156. C Rovelli, F Vidotto: “On the spinfoam expansion in cosmology”, Class. Quantum Grav. 27 (2010) 145005, arXiv:0911.3097
157. MV Battisti, A Marciano, C Rovelli: “Triangulated Loop Quantum Cosmology: Bianchi IX and inhomogenous perturbations”, Physical Review D81 (2010) 064019, arXiv:0911.2653
158. Y Ding, C Rovelli: “The volume operator in covariant quantum gravity”, Class. Quantum Grav. 27 (2010) 165003, arXiv:0911.0543
159. E Alesci, C Rovelli: “A regularization of the hamiltonian constraint compatible with the spinfoam dynamics”, Physical Review D.82 (2010) 044007. arXiv:1005.0817
160. E Bianchi, D Regoli, C Rovelli: “Face amplitude of spinfoam quantum gravity”, Class. Quantum Grav. 27 (2010) 185009 arXiv:1005.0764
161. C Rovelli: “A new look at loop quantum gravity”, Class. and Quantum Grav. “Special Issue” on the GR19 Conference”, to appear, arXiv:1004.1780
162. E Bianchi, C Rovelli, F Vidotto: “Towards Spinfoam Cosmology”, Physical Review D 82 (2010) 084035, arXiv:1003.3483
163. E Bianchi, C Rovelli: “Why all these prejudices against a constant?”, arXiv:1002.3966
164. Eugenio Bianchi, Carlo Rovelli: “Is dark energy really a mystery?”, Nature, 466 (2010) 321.
165. C Rovelli, S Speziale, “On the geometry of loop quantum gravity on a graph”, Phys. Rev. D82 (2010) 044018, arXiv:1005.2927
166. C Rovelli, M Smerlak: “Thermal time and the Tolman-Ehrenfest effect: temperature as the ‘speed of time’ ”, submitted to Classical and Quantum Gravity, arXiv:1005.2985
167. You Ding, C Rovelli: “Physical boundary Hilbert space and volume operator in the Lorentzian new spin-foam theory”, Class. Quantum Grav. 27 (2010) 205003, arXiv:1006.1294.
168. A Henderson, C Rovelli, F Vidotto, E Wilson-Ewing: “Local spinfoam expansion in loop quantum cosmology”, Class. Quantum Grav. 28 (2011) 025003, arXiv:1010.0502
169. C Rovelli: “Simple model for quantum general relativity from loop quantum gravity”, submitted to Journal of Physics: Conference Series (JPCS), arXiv:1010.1939
170. C Rovelli, M Smerlak “Spinfoams: summing = refining” arXiv:1010.5437
171. C Rovelli: “Some Considerations on Infinity in Physics”, in *Infinity. New Research Frontiers*, Michael Heller and W. Hugh Woodin editors, pg 167-175. Cambridge University Press, 2011.
172. Y Ding, M Han, C Rovelli, “Generalized Spinfoams”, arXiv:1011.2149, submitted to PRD
173. C Rovelli: “Loop Quantum Gravity: the last 25 years”, to appear on Classical and quantum gravity.
174. C Rovelli, S Speziale “Lorentz covariance of loop quantum gravity”, arXiv:1012.1739, submitted to PRD
175. Spinfoam fermions E Bianchi, M Han, E Magliaro, C Perini, C Rovelli, W Wieland arXiv:1012.4719, submitted to PRD
176. M Han, C Rovelli “Spinfoam Fermions: PCT Symmetry, Dirac Determinant, and Correlation Functions” arXiv:1101.3264, submitted to PRD
177. Eugenio Bianchi, Thomas Krajewski, Carlo Rovelli, Francesca Vidotto “Cosmological constant in spinfoam cosmology”. arXiv:1101.4049, submitted to PRD

#### Invitations to international conferences

1. “Loop Quantum Gravity”, GR-19, Mexico City, Mexico, July 2010.
2. “Spin foams and LQG”, LOOPS 09, Beijing, China, August 2009
3. “A new look on Quantum Gravity”, Quantum gravity and non-commutative geometry, Department of Mathematics, La Sapienza, Rome, Italy, October 2008
4. “Loop Quantum Gravity”, STRINGS 08, Cern, Geneve, Switzerland, August 2008

5. "Relating spinfoams and LQG", Quantum Gravity & Quantum Geometry, Nottingham,UK, July 2008
6. "LQG vertex", LOOPS07, Morelia, Mexico, June 2007
7. "n-point functions in background independent QFT", Gerard60, Conference in honor of G 't Hooft. Holand, July 2006
8. "Loop Quantum Gravity", Le siècle d'Albert Einstein, July 2005, UNESCO, Paris.
9. "Graviton propagator without a background", LOOPS 2005, October 2005, Potsdam, Germany.
10. "La Relatività", Congresso della Società Italiana di Fisica, Novembre 2005, Catania, Italy.
11. "Quantum Gravity", Physics 2005 A Century after Einstein, April 2005, Warwick, United Kingdom.
12. "Loop Quantum Gravity", Spacetime in Action Mars 2005, Pavia, Italy.
13. "Extracting physical predictions from generally covariant quantum field theory", Isham fest, Conference in honor of Chris Isham, London, September 2004
14. "Spinfoams and loops", Mexican School on Gravitational Physics, Playa del Carmen, Mexico, October 2004.
15. "Loop Quantum Gravity", SIGRAV Conferenza di relatività generale e fisica della gravitazione, Vietri, Settembre 2004
16. "Spinfoams", International Conference on Quantum Gravity, Penn State University, Pennsylvania, July 2003
17. "Conceptual problems in quantum gravity", La philosophie de la nature aujourd'hui: les apports des mathématiques, de la physique et de la biologie, Paris, March 2003.
18. "Il Cambiamento nella Scienza", La Genesi del Nuovo, Pisa November 2002
19. "Relational Quantum Theory", QUO Vadis Quantum Mechanics? International Colloquium on the foundation of Quantum Theory, Temple University, Philadelphia, September 2002.
20. "Relativistic foundations of mechanics", Topics in mathematical physics, general relativity and cosmology, Mexico City, September 17-20 2002.
21. "Gravity, Quantum, Time, Loops and Spin networks", DICE 2002, Piombino, September 2002.
22. "Loop quantum gravity", SIGRAV 15th Conference on General Relativity and Gravitational Physics Rome, September 2002.
23. "General Relativistic Mechanics and Statistical Mechanics", Field Theory and Statistical Mechanics, Rome, June 2002.
24. "Quantum Gravity: the State of the Art", 2001 A Spacetime Odyssey, Florence, September 2001
25. "Spin Foams", GR16: International Conference on general Relativity and Gravitation, Durban, South Africa, July 2001.
26. "Spin foam models", 3rd Meeting on canonical quantum gravity, Warsaw, Poland June 2001.
27. "Loops", Seven Pines Symposium, Missouri, United States June 2001.
28. "La mécanique quantique de l'Espace-Temps", Invited lecture at the meeting "Un siècle après Planck", Académie des Sciences, Paris décembre 2000.
29. "On the history of Quantum Gravity", Invited lecture at the IX Marcell Grossman Meeting in Roma, July 2000.
30. "Spin foam models", Invited lecture at the IX Marcell Grossman Meeting in Roma, July 2000.
31. "The Dynamics of loop quantum gravity", Invited lecture at the Conference on Strong Gravitational Fields, ITP Santa Barbara, June 1999.
32. "Quantum Spacetime", Invited lecture at the American Physical Society meeting, Columbus, Ohio, April 1998
33. "Spin foam models", Invited lecture at the American Mathematical Society meeting, Baltimore, January 1998
34. "Quantum Gravity", Plenary Lecture at the GR15, Puna, India, December 1997
35. "Loops", Meeting on quantum gravity, Bangalore, December 1998
36. "Black hole entropy from loop quantum gravity", Marcel Grossman 8, Jerusalem, June 1997

37. "General relativity in terms of Dirac eigenvalues", Marcel Grossman 8, Jerusalem, June 1997
38. "The problem of time in quantum gravity", Invited talk at the "Marcel Grossman 8", Jerusalem, June 1997
39. "Spacetime Quantum Geometry", Invited speaker at the "2<sup>nd</sup> Workshop on Quantum Gravity", Warsaw, Poland, June 1997
40. "Black hole entropy from first principles", Plenary lecture at the International Conference on "Constrained systems and Quantum Gravity", Santa Margherita Ligure, Italy, September 1996
41. "Recoupling theory in Quantum Gravity", Plenary lecture at the "Journées Relativistes", Ascona, Switzerland, May 1995
42. "Is there any view of spacetime compatible with today's physics?", Invited speaker (panelist) at the 1996 International Fellows Conference of the Center for Philosophy of Science, Castiglioncello, May 1996
43. "Localization in Quantum Field Theory: Which aspects of Quantum Field Theory are compatible with what we know about spacetime?", Invited speaker at the 1996 Boston Colloquium for Philosophy of Science: "Reflections on the Foundations of Quantum Field theory", Boston Center for the Philosophy of Science, Boston, March 1996.
44. "The role of constrained systems theory in fundamental physics", Conference overview and closing remarks at the "Topical meeting on constrained systems and Quantum Gravity", Dubna, Russia, July 1995.
45. "Loop Representation, recent results", Invited plenary talk at the "Topical meeting on constrained systems and Quantum Gravity", Dubna, Russia, July 1995.
46. "Evolution in nonperturbative quantum gravity", 3 lectures  
Workshop on Canonical and Quantum Gravity, Stephen Banach Center of the Polish Academy of Sciences, Warsaw, Poland, May 1995.
47. "Hamilton-Jacobi theory for constrained systems and gauge invariant degrees of freedom in general relativity and Yang-Mills theory", "Constraint Theory and Quantization Methods", Siena, Italy August 1994. Proceedings: Eds F Colomo, L Lusanna G Marmo, page 401, World Scientific 1994
48. "Canonical Quantum General Relativity", Meeting on Quantum Gravity, Newton Institute, Cambridge, England, July 1994
49. "Half way through the woods", Center for the Philosophy of Science of the University of Pittsburgh, Lecture Annual Series, December 1993.
50. "A prediction from Quantum Gravity", IInd Texas/Pascos International conference on High-Energy Physics and Astrophysics, Berkeley, California, 12-16 December 1992
51. "A Physical Prediction from Quantum Gravity", Congresso nazionale di Relatività Generale e Fisica della Gravitazione, Bardonecchia, Italia, 2-5 September 1992
52. "The complete set of canonical diffeomorphism invariant observables of General Relativity", GR13, Cordoba, Argentina, 26-30 June 1992
53. "Time from Thermodynamics?", GR13, Cordoba, Argentina, 26-30 June 1992
54. "Canonical classical and quantum gravity", Series of lectures, Workshop on Gravitation, Cochin, India, December 1991
55. "Narada's Quest: Conceptual problems and present approaches to Quantum Gravity", International conference of Gravitation and Cosmology, Amedabhad, India, December 1991. Published in "Advances in gravitation and cosmology", eds B R Iyer, A R Prasanna R K Varma C V Vishveshwara, Wiley Eastern Ltd, New Delhi 1993
56. "Solutions of the Wheeler DeWitt equation", Journées Relativistes, Cargèse, Corsica, May 1991
57. "Gravitoni e ricami", Congresso nazionale di Relatività Generale e Fisica della Gravitazione, Capri, Italia, September 1990
58. "Canonical Quantum Gravity", International Workshop on Gravitation, Banff, Canada, August 1990
59. "Holonomies and quantum gravity", Recent advances in general relativity, Pittsburgh, May 1990. Published in Recent advances in General Relativity, eds A I Janis and J R Porter, Birkhauser, Boston 1991

60. "Loop Representation in Quantum Gravity", 12th International Conference on General Relativity and Gravitation, Boulder, Colorado, July 1989
61. "Knots are fundamental states of quantum gravity", Twelfth John Hopkins workshop on current problems in high energy particle theory, Firenze 1989
62. "The Transform Approach to the Loop Representation", Italian Conference on General Relativity and Gravitation, Cavalese, Italy August 1988
63. "Is there incompatibility between the ways time is treated in general relativity and in standard quantum mechanics?", Osgood Hill conference on conceptual problems of quantum gravity, Boston 1988 Published in *Conceptual problems of quantum gravity*, op. cit.
64. "Loop representation in quantum gravity, the transform approach", Osgood Hill conference on conceptual problems of quantum gravity, Boston 1988 Published in "Conceptual problems of quantum gravity" Eds A Ashtekar and J Stachel (Birkhauser, New York, 1991)
65. "A new approach to quantum gravity", International conference on General Relativity and Cosmology, Goa, India 1987

### Some seminars

1. "Space and time in General Relativity", Three lectures at the school on "Space and Time in Physics and Philosophy" Geneva Summer School 2008, Arolla, Switzerland, July 2008.
2. "Loop quantum gravity and loop quantum cosmology", Bi-séminaire de cosmologie théorique, Institut Henri Poincaré, Paris, September 21st, 2007.
3. "Graviton propagator", Dipartimento di Fisica, Università di Roma Tre. October 2nd, 2006.
4. "Espace et temps en relativité générale", Département de philosophie, Université de Aix-en-Provence, February 7th, 2006.
5. "Une introduction à la gravité quantique à boucles", Ecole Nationale Supérieure de Lyon, January 31, 2006.
6. "Loop Quantum Gravity", Ecole Nationale Supérieure, Paris, April 18, 2005.
7. "Quantum gravity", "Landelijk Seminarium" (National Seminar) NIKHEF, Amsterdam, March 2004.
8. "Time in physics", University College, London, February 2004.
9. "Loop Quantum Gravity", Saclay, Paris, February 2004.
10. "Interpretation Relationelle de la Mécanique Quantique", Département de Philosophie, Ecole Polytechnique, Paris, November 2003.
11. "Relational Quantum Theory", Perimeter Institute, Toronto, Canada, February 2003.
12. "Structure of general covariant quantum theories", Perimeter Institute, Toronto, Canada, February 2003.
13. "Time", Louisiana State University Colloquium, September 2002.
14. "The foundation of relativistic mechanics", Penn State University, September 2002.
15. "Current approaches to quantum gravity", Dipartimento di Filosofia, Università di Firenze, Firenze, Dicembre 2001.
16. "Spin foam models", Dipartimento di Fisica, Università di Firenze, Firenze, Dicembre 2001.
17. "Spin foam models", Dipartimento di Fisica, Università di Roma, Roma, Settembre 2001.
18. "Meccanica quantistica relazionale", Dipartimento di Filosofia, Università di Firenze, Firenze, Marzo 2001.
19. "Loop Quantum Gravity", CERN, Genève, January 2000.
20. "Non perturbative quantum gravity", Cornell University Colloquium, September 1999.
21. "Osservabilità in Relatività Generale", Università di Parma, Parma, May 1999.
22. "Quantum Spacetime", Fondation Louis De Broglie lecture series. Institute Henry Poincaré, Paris May 1999.
23. "Integration over Lapse and Dynamics", Center for Gravitational Physics and Geometry, Penn State University, December 1998.
24. "Spin Foam models", Department of Physics, University of Pittsburgh, December 1998.
25. "Quantum Spacetime", Centre de Physique Théorique de Luminy, France, November 1998.

26. "The Area operator", Centre de Physique Theorique, CNRS-Luminy, France, November 1998.
27. "Incerto Tempore, Incertisque Locis", Center for the History and Philosophy of Science, Pittsburgh, April 1998.
28. "Loop quantum gravity", Caltech, March 1997.
29. "Sum over surfaces", Institute for Theoretical Physics, Santa Barbara, March 1997
30. "The Issue of Time in Quantum Gravity", Department of Physics, University of Roma. February 1997.
31. "Black Hole Entropy", SISSA, Trieste, Italy.
32. "Black Hole Entropy", Dipartimento di fisica, Università di Pisa, Italy.
33. "Non-perturbative Quantum Gravity", Cycle of 4 lectures at the University of Rome, Italy. January 1997
34. "Relational Quantum Mechanics", Department of Philosophy, University of Western Ontario. London, Canada. December 1996
35. "Physics with Quantum Gravity", University of Western Ontario. London, Canada. December 1996.
36. "Black Hole Physics", University of Waterloo. Ontario, Canada. December 1996.
37. "Sum over surfaces form of quantum gravity", Center for Gravitational physics and geometry - Penn State. October 1997.
38. "Loop Quantum Gravity", Albert Einstein Institute - Potsdam. Berlin, August 1996.
39. "Entropy of Black Holes from the Spectrum of the Area", Erwin Schrödinger Institute. Vienna, July 1996
40. "Black Hole Thermodynamics from Quantum Gravity", University of Berne, May 1996
41. "Loop Quantum Gravity", Università di Padova, May 1996
42. "Non perturbative quantum gravity; status and perspectives", Université de Marseille, Luminy, France, June 1995
43. "Risultati recenti in gravità non perturbativa", Università di Trento, Italy, May 1995
44. "C\* Algebras and the Origin of Time", Center for Gravitational Physics and Geometry, Penn State, Usa, November 1994
45. "Generally covariant quantum field theory", Max Planck Institute, München, Germany, November 1994
46. "The Loop Representation of Quantum Gravity", Institute Isaac Newton, Cambridge, England, February 1994
47. "Quantum Gravity", University of Oxford, England, February 1994
48. "On the Ponzano-Regge model", University of Nottingham, England, February 1994
49. "The Loop Representation of Quantum Gravity", Imperial College, London England, January 1994
50. "Physical Hamiltonian in Quantum Gravity", University of Maryland, October 1993
51. "What does present days physics tell us about Time and Space ?", Annual Lecture at the Center for the Philosophy of Science Pittsburgh University, 16 September 1993
52. "The recent developments in Quantum gravity", University of Chicago, Chicago USA, 16 April 1993
53. "Quantum Gravity in the Loop Representation and Microstructure of space-time", Princeton University, Princeton USA, 21 February 92
54. "A non-perturbative approach to Quantum Gravity", Instituto de Pesquetas Fisicas, Rio di Janeiro, Brasile 18 July 1992
55. "A Generally covariant quantum field theory", Syracuse University, Syracuse, NewYork, USA 15 September 1992
56. "The Hamilton-Jacobi solutions of General Relativity", University of Texas, Austin, Texas, USA, 12 April 1992
57. "Knots and Quantum Geometry", Foundations of Physics-meeting, Sarasota, Florida, USA, 22 March 1992
58. "Loop Representation of quantum gravity", Dipartimento di Fisica, Università di Roma La Sapienza, Roma, 26 May 1992

### Other scientific works

1. C Rovelli: “Teoria dei Campi nello Spazio dei Sistemi di Riferimento”, Thesis Bologna 1981
2. E Omerti, C Rovelli: “A lattice formulation of the interacting Boson gas”, Unpublished, 1983
3. C Rovelli: “Fantasmi nelle teorie gravitazionali con un campo scalare”, Atti del VI convegno nazionale di Relatività Generale e Fisica della Gravitazione Firenze 1984
4. C Rovelli: “Diffeomorphisms invariance in canonical General Relativity and in Quantum Gravity”, Acts of the GR11, Stockholm 1986
5. C Rovelli: “Superconduttori in campi gravitazionali relativistici” Unpublished, 1986
6. C Rovelli: “Two new Lagrangians for general relativity”, Unpublished, 1986
7. C Rovelli: “Continuous tensor products in Quantum Gravity”, Atti del VII convegno nazionale di Relatività Generale e Fisica della Gravitazione, Rapallo, 1986
8. M Cerdonio, GA Prodi, C Rovelli, S Vitale: “Feasibility of Laboratory detection of rotation-like gravitational fields”, Acts of the GR11, Stockholm 1986
9. C Rovelli: “Sulla quantizzazione della teoria della gravità”, Ph D Thesis, Trento, 1987
10. C Rovelli: “Time in quantum gravity” Rome University preprint, unpublished, March 1988
11. C Rovelli, L Smolin: “Loop representation for Yang Mills theories: Lattice” Syracuse University preprint, unpublished (1989)
12. C Rovelli: “Loop representation for Yang Mills theories: Continuum” University of Roma preprint, unpublished (1989)

Marseille, October 2010