Christopher Alan Fuchs

Curriculum Vitae
3 January 2007

Personal:

Work address:	Bell Labs, Alcatel-Lucent 600–700 Mountain Avenue, Room 1D-426 Murray Hill, New Jersey 07974 USA
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Internet:	`cafuchs@research.bell-labs.com` `http://netlib.bell-labs.com/who/cafuchs`
Birthdate:	21 October 1964
Birthplace:	Cuero, Texas
Citizenship:	United States of America
Spouse:	Kristen Michele Fuchs, married 26 August 1995
Children:	Emma Jane Fuchs, born 12 January 1999 Katherine Viola Fuchs, born 17 December 2001

Research Interests:

Quantum information theory
Quantum communication and cryptography
Quantum foundations in the light of quantum information
Quantum control and quantum computation

Present Employment:

Member of Technical Staff, Bell Labs, Alcatel-Lucent

Education:

Ph. D. in Physics, May 1996, The University of New Mexico, Albuquerque, New Mexico
Dissertation: "Distinguishability and Accessible Information in Quantum Theory"
Advisor: Carlton M. Caves

B. S. in Physics, with High Honors, December 1987
B. S. in Mathematics, with High Honors, December 1987
The University of Texas at Austin, Austin, Texas

Honors, Professional Awards, and Invited Community Service:

Associate Editor, *Quantum Information and Computation*, Rinton Press, since 2000.

2-Year Member-at-Large, Executive Committee, American Physical Society Topical Group on Quantum Information, 2007–2008.

Adjunct Professor of Physics and Astronomy, University of New Mexico, Albuquerque, New Mexico, since 2006. (Adjunct Assistant Professor, 2000–2005.)

Member, Technology Experts Panel, United States Advanced Research and Development Activity (ARDA) Roadmap for Quantum Cryptography, since 2003.

Member, National Science Foundation Review Panel on Mathematical Physics, 2005.

E. T. S. Walton Visitor Award, Science Foundation Ireland, consisting of the compensation of my Bell Labs salary + 20% cash award + research funds for a sabbatical to Communications Network Research Institute, Dublin, Ireland, April 2003 – August 2004.

Guest Professor, Research Center for Quantum Communication, Tamagawa University, Tokyo, Japan, since 2000.

Advisory Board, International Center for Mathematical Modeling, Växjö University, Växjö, Sweden, since 2001.

Member, Pacific Institute of Theoretical Physics, University of British Columbia, Vancouver, Canada, since 2004.

Paper A27 below listed among the "top ten breakthroughs of the year 1998" by the editors of *Science*.

Known citations in the ISI Science Citation Index > 2,000.

Awarded and Endowed Lectures:

Squire Lecturer, Grinnell College, Grinnell, Iowa, 2006.

Michelson Postdoctoral Prize Lectureship, Case Western Reserve University, Cleveland, Ohio, 1998.

Grants Administered:

Principal Investigator (with C. Beisbart, S. Hartmann, and V. Palge), "Antrag zur Foerderungd einer Konferenz mit anschliesender Sommerschule," contract for German VolkswagenStiftung, (funds used to organize conference "Being Bayesian in a Quantum World," 1–5 August 2005, Konstanz, Germany, and an associated summer school). Total funding: 67,000 euro.

Principal Investigator (with C. M. Caves), "Theoretical Investigations in Quantum Information Science: Quantum Nonlocality and Entanglement," contract for United States Office of Naval Research, 1 April 2000 – 31 March 2003. Total funding: $300,000.

Postdoctoral Fellowships:

Director-Funded Postdoctoral Fellowship, Los Alamos National Laboratory, Los Alamos, New Mexico. Sponsor: Salman Habib. (October 1999 – October 2000)

Lee A. DuBridge Prize Postdoctoral Fellowship, California Institute of Technology, Pasadena, California. Sponsors: H. Jeff Kimble and John Preskill. (October 1996 – October 1999)

Postdoctoral Fellowship, Département I.R.O., Université de Montréal, Montréal (Québec), Canada. Sponsor: Gilles Brassard. (January 1996 – October 1996)

Organizational Activities:

Co-organizer (with S. H. Simon), *Quantum Information Meets Nanotechnology*, Bell Labs, Lucent Technologies, Murray Hill, New Jersey, 11 July 2006.

Member, Advisory and Award Committee, *Fifth, Sixth, Seventh, and Eighth International Conferences on Quantum Communication, Measurement, and Computing (QCMC)*, 2000, 2002, 2004, 2006.

Member, Program Committee, American Physical Society Topical Group on Quantum Information, 2006–2007.

Member, Organizing Committee, *New Directions in the Foundations of Physics, 2007*, American Institute of Physics, College Park, Maryland, April 2007.

Editorial Committee (with H. Barnum and R. Rynasiewicz), Festschrift for Jeffrey Bub's 65th Birthday, *Foundations of Physics*, special issues, 2006.

Co-organizer (with A. Khrennikov), *Foundations of Probability and Physics – 4*, Växjö University, Växjö, Sweden, 4–9 June 2006.

Member, Nominating Committee, American Physical Society Topical Group on Quantum Information, 2005–2006.

Co-organizer (with M. O. Scully), *Wheelerfest, a Meeting for Quantum Information and Foundations*, Princeton University, Princeton, New Jersey, 24–25 February 2006.

Editor, Festschrift for Asher Peres's 70th Birthday, *Foundations of Physics*, Vol. 35, Nos. 11–12, 2005 and Vol. 36, No. 1, 2006.

Co-organizer (with C. M. Caves, S. Hartmann, and R. Schack), *Being Bayesian in a Quantum World*, Konstanz, Germany, 1–5 August 2005.

Co-organizer (with H. Barnum, R. Hudson, and A. Khrennikov), *Quantum Theory: Reconsideration of Foundations–2, Quantum Logic Meets Quantum Information*, Växjö University, Växjö, Sweden, 1–6 June 2003.

Co-editor (with J. Bub), Special Issue on Quantum Information and Computation, *Studies in the History and Philosophy of Modern Physics*, September 2003 issue.

Co-organizer (with G. Brassard), *Workshop on Quantum Foundations in the Light of Quantum Information II*, Université de Montréal, Montréal, Canada, 13 October – 3 November 2002.

Co-organizer (with A. Barg, L. Fortnow, and P. W. Shor), *National Science Foundation Planning Workshop on Quantum Communications, Cryptography, and Coding*, Elmsford, New York, 17–18 January 2002.

Co-organizer (with P. Lahti and A. Khrennikov), *Quantum Theory: Reconsideration of Foundations, Shannon meets Bohr*, Växjö University, Växjö, Sweden, 17–21 June 2001.

Co-organizer (with O. Hirota), *Second Tokyo International Quantum Information Seminar*, Oiso Prince Hotel, Tokyo, Japan, 11–15 March 2001.

Co-organizer (with G. Brassard), *Meeting on Quantum Foundations in the Light of Quantum Information and Cryptography*, Université de Montréal, Montréal, Canada, 17–19 May 2000.

Co-organizer (with O. Hirota), *First Tokyo International Quantum Information Seminar*, Tamagawa University, Tokyo, Japan, 13–14 March 2000.

Co-organizer (with C. M. Caves and M. H. Holzscheiter), *Northern New Mexico Complexity, Entropy, and Physics of Information Seminar Series*, Santa Fe Institute, Santa Fe, New Mexico, January 2000 – October 2000.

Patents Pending:

C. A. Fuchs, M. Vasilyev and B. Yurke, "Optical Analyzers of Polarization Properties," Serial Number 10/812164, filed 29 March 2004.

Student Projects and Theses Supervised:

H. B. Dang, California Institute of Technology and Princeton University, USA, "Quasi-Orthonormal Bases on the Cone of Positive Operators," Bell Labs Summer Research Program, Summer 2006.

M. Pérez-Suárez, University of Vigo, Spain, "Properties of Informationally Complete Measurements," Communications Network Research Institute Visiting Ph. D. Student, Spring 2004.

G. G. Plunk, Cornell University, USA, "Investigations on Informationally Complete Measurements," Bell Labs Summer Research Program, Summer 2002.

P. F. Scudo, Technion–Israel Institute of Technology, Israel, "Quantum de Finetti Representation Theorems for Completely Positive Maps," DIMACS Graduate Research Fellowship, Spring 2002.

F. Verstraete, Ghent University, Belgium, "Gleason-like Theorems for Entanglement and Completely Positive Maps," DIMACS Graduate Research Fellowship, Spring 2002.

J. M. Renes, University of New Mexico, USA, "Effect Algebras and the Quantum Probability Rule," Summer Ph. D. Research, Summer 2001.

R. A. Obajtek, Saint Louis University, USA, "Quantum Cryptography with Trinary Qutrit Alphabets," Bell Labs Summer Research Program, Summer 2001.

N. E. Baytch, Harvard University, USA, "Nonorthogonal Variations of Gleason's Theorem in Quantum Mechanics," Los Alamos National Laboratory Summer Intern Program, Summer 2000.

P. Hayden, University of Oxford, England, "Distributing Quantum Information," Los Alamos National Laboratory Visiting Student, April–May 2000.

R. Schumann, University of Stellenbosch, South Africa, "Quantum Information Theory," Master's Thesis, Spring–Summer 2000.

T. L. Poo, University of Oxford, England, "Entanglement–Information Relations in Quantum Information Processing," Caltech Summer Undergraduate Research Fellowship, Summer 1998.

J. A. Cortese, California Institute of Technology, USA, "Entanglement-Enhanced Classical Communication on the Amplitude Damping Channel," beginning Ph. D. project, Spring–Summer 1997.

Professional Affiliations:

American Mathematical Society (member)
American Physical Society (member)
Center for Discrete Mathematics & Theoretical Computer Science (permanent member)
Institute for Science and Interdisciplinary Studies (member)
International Quantum Structures Association (member)
Philosophy of Science Association (member)
William James Society (member)

Foundations and Funding Agencies Advised:

John D. and Catherine T. MacArthur Foundation, USA
National Science Foundation, USA
European Science Foundation, EU
Austrian Academy of Sciences, Austria
Science Foundation Ireland, Republic of Ireland
Israel Science Foundation, Israel
Science and Technology Assistance Agency, Slovakia
Canadian Institute for Advanced Research, Canada
Netherlands Organisation for Scientific Research, The Netherlands
Fonds National Suisse de la Recherche Scientifique, Switzerland

Journals Refereed:

American Journal of Physics
Annals of Physics
European Physical Journal D
Europhysics Letters
Foundations of Physics
IEEE Transactions on Information Theory
International Journal of Quantum Information
Journal of Applied Mathematics
Journal of Mathematical Physics
Journal of Modern Optics
Journal of Optics
Journal of Physics A
Nature
Open Systems & Information Dynamics
Physica Scripta
Physical Reviews A & E
Physical Review Letters
Physics Letters A
Physics Today
Quantum Information and Computation
Quantum Information Processing
Studies in History and Philosophy of Modern Physics

ARTICLES AND PUBLICATIONS:

All of my publications follow an alphabetical author-ordering convention with the exception of articles A35, A36, and B13, from my early student years, and the report on some experimental work in A28.

A. Publications in Professional Journals and Reprint Collections

1. C. M. Caves, C. A. Fuchs, and R. Schack, "Subjective Probability and Quantum Certainty," to appear in *Studies in History and Philosophy of Modern Physics* (2007). `quant-ph/0608190`.
2. C. A. Fuchs, "On the Quantumness of a Hilbert Space," *Quantum Information and Computation* **4**(6/7), 467–478 (2004). [Preprinted in *Quantum Information, Statistics, Probability: Dedicated to Alexander S. Holevo on the Occasion of His 60th Birthday*, edited by O. Hirota (Rinton Press, Princeton, NJ, 2004), pp. 65–77.] `quant-ph/0404122`.
3. C. A. Fuchs, M. Pérez-Suárez and D. J. Santos, "Insights and Implications from a Bayesian Approach to Quantum Information," *International Journal of Quantum Information* **3**(1), 233–237 (2005).
4. K. M. R. Audenaert, C. A. Fuchs, C. King, and A. Winter, "Multiplicativity of Accessible Fidelity and Quantumness for Sets of Quantum States," *Quantum Information and Computation* **4**(1), 1–11 (2004). `quant-ph/0308120`.
5. C. A. Fuchs, R. Schack, and P. F. Scudo, "A de Finetti Representation Theorem for Quantum Process Tomography," *Physical Review A* **69**(6), 062305/1–6 (2004). [Reprinted in *Virtual Journal of Quantum Information* **4**(6).] `quant-ph/0307198`.
6. C. M. Caves, C. A. Fuchs, K. K. Manne, and J. M. Renes, "Gleason-Type Derivations of the Quantum Probability Rule for Generalized Measurements," *Foundations of Physics* **33**(2), 193–209 (2004). `quant-ph/0306179`.
7. C. A. Fuchs and M. Sasaki, "Squeezing Quantum Information through a Classical Channel: Measuring the 'Quantumness' of a Set of Quantum States," *Quantum Information and Computation* **3**(5), 377–404 (2003). `quant-ph/0302092`.
8. C. A. Fuchs, "Quantum Mechanics as Quantum Information, Mostly," *Journal of Modern Optics* **50**(6/7), 987–1023 (2003).
9. C. M. Caves, C. A. Fuchs and R. Schack, "Conditions for Compatibility of Quantum-State Assignments," *Physical Review A* **66**(6), 062111/1–11 (2002). `quant-ph/0206110`.
10. S. J. van Enk and C. A. Fuchs, "Quantum State of a Propagating Laser Field," *Quantum Information and Computation* **2**(2), 151–165 (2002). `quant-ph/0111157`.
11. C. M. Caves, C. A. Fuchs and R. Schack, "Unknown Quantum States: The Quantum de Finetti Representation," *Journal of Mathematical Physics* **43**(9), 4537–4559 (2002). [Reprinted in *Virtual Journal of Quantum Information* **2**(9).] `quant-ph/0104088`.
12. S. J. van Enk and C. A. Fuchs, "Quantum State of an Ideal Propagating Laser Field," *Physical Review Letters* **88**(2), 027902/1–4 (2002). `quant-ph/0104036`.
13. C. M. Caves, C. A. Fuchs and R. Schack, "Quantum Probabilities as Bayesian Probabilities," *Physical Review A* **65**(2), 022305/1–6 (2002). `quant-ph/0106133`.
14. S. L. Braunstein, C. A. Fuchs, H. J. Kimble, and P. van Loock, "Quantum versus Classical Domains for Teleportation with Continuous Variables," *Physical Review A* **64**(2), 022321/1–16 (2001). `quant-ph/0012001`.
15. C. M. Caves, C. A. Fuchs, and P. Rungta, "Entanglement of Formation of an Arbitrary State of Two Rebits," *Foundations of Physics Letters* **14**(3), 199–212 (2001). `quant-ph/0009063`.
16. C. A. Fuchs and K. Jacobs, "Information-Tradeoff Relations for Finite-Strength Quantum Measurements," *Physical Review A* **63**(6), 062305/1–15 (2001). `quant-ph/0009101`.
17. H. Barnum, C. M. Caves, C. A. Fuchs, R. Jozsa, and B. Schumacher, "On Quantum Coding for Ensembles of Mixed States," *Journal of Physics A* **34**(35), 6767–6785 (2001). `quant-ph/0008024`.
18. C. A. Fuchs and A. Peres, "Quantum Theory – Interpretation, Formulation, Inspiration: Fuchs and Peres Reply," *Physics Today* **53**(9), 14, 90 (2000).

19. S. L. Braunstein, C. A. Fuchs, D. Gottesman, and H.-K. Lo, "A Quantum Analog of Huffman Coding," *IEEE Transactions on Information Theory* **46**(4), 1644–1649 (2000). `quant-ph/9805080`.

20. C. A. Fuchs and A. Peres, "Quantum Theory Needs No 'Interpretation'," *Physics Today* **53**(3), 70–71 (2000).

21. H. Barnum, C. M. Caves, J. Finkelstein, C. A. Fuchs, and R. Schack, "Quantum Probability from Decision Theory?," *Proceedings of the Royal Society of London A* **456**, 1175–1182 (2000). `quant-ph/9907024`.

22. J. R. Buck, S. J. van Enk, and C. A. Fuchs, "Experimental Proposal for Achieving Superadditive Communication Capacities with a Binary Quantum Alphabet," *Physical Review A* **61**(3), 032309/1–7 (2000). `quant-ph/9903039`.

23. S. L. Braunstein, C. A. Fuchs, and H. J. Kimble, "Criteria for Continuous-Variable Quantum Teleportation," *Journal of Modern Optics* **47**(2/3), 267–278 (2000). `quant-ph/9910030`.

24. C. H. Bennett, D. P. DiVincenzo, C. A. Fuchs, T. Mor, E. Rains, P. W. Shor, J. A. Smolin, and W. K. Wootters, "Quantum Nonlocality without Entanglement," *Physical Review A* **59**(2), 1070–1091 (1999). `quant-ph/9804053`.

25. C. A. Fuchs and J. van de Graaf, "Cryptographic Distinguishability Measures for Quantum Mechanical States," *IEEE Transactions on Information Theory* **45**(4), 1216–1227 (1999). `quant-ph/9712042`.

26. D. P. DiVincenzo, C. A. Fuchs, H. Mabuchi, J. A. Smolin, A. Thapliyal, and A. Uhlmann, "Entanglement of Assistance" *Lecture Notes in Computer Science* **1509**, 247–257 (1999). `quant-ph/9803033`.

27. C. A. Fuchs, "Information Gain vs. State Disturbance in Quantum Theory," *Fortschritte der Physik* **46**(4,5), 535–565 (1998). [Reprinted in *Quantum Computation: Where Do We Want to Go Tomorrow?*, edited by S. L. Braunstein (Wiley–VCH Verlag, Weinheim, 1999), pp. 229–259.] `quant-ph/9611010`.

28. A. Furusawa, J. L. Sørensen, S. L. Braunstein, C. A. Fuchs, H. J. Kimble, and E. S. Polzik, "Unconditional Quantum Teleportation," *Science* **282**(5389), 706–709 (1998). [This article was listed in *Science* as one of the top ten "breakthroughs of the year" in 1998; see *Science* **282**(5397), 2156–2161 (1998).]

29. D. Bruß, D. P. DiVincenzo, A. Ekert, C. A. Fuchs, C. Macchiavello, and J. A. Smolin, "Optimal Universal and State-Dependent Quantum Cloning," *Physical Review A* **57**(4), 2368–2378 (1998). `quant-ph/9705038`.

30. C. A. Fuchs, "Nonorthogonal Quantum States Maximize Classical Information Capacity," *Physical Review Letters* **79**(6), 1162–1165 (1997). [Reprinted in *Quantum Information and Quantum Computation*, edited by C. Macchiavello, G. M. Palma, and A. Zeilinger (World Scientific, Singapore, 2000), pp. 207–210.] `quant-ph/9703043`.

31. C. A. Fuchs, N. Gisin, R. B. Griffiths, C.-S. Niu, and A. Peres, "Optimal Eavesdropping in Quantum Cryptography. I. Information Bound and Optimal Strategy," *Physical Review A* **56**(2), 1163–1172 (1997). `quant-ph/9701039`.

32. H. Barnum, C. A. Fuchs, R. Jozsa, and B. Schumacher, "General Fidelity Limit for Quantum Channels," *Physical Review A* **54**(6), 4707–4711 (1996). `quant-ph/9603014`.

33. C. A. Fuchs and A. Peres, "Quantum State Disturbance vs. Information Gain: Uncertainty Relations for Quantum Information," *Physical Review A* **53**(4), 2038–2045 (1996). `quant-ph/9512023`.

34. H. Barnum, C. M. Caves, C. A. Fuchs, R. Jozsa, and B. Schumacher, "Noncommuting Mixed States Cannot Be Broadcast," *Physical Review Letters* **76**(15), 2818–2821 (1996). [Reprinted in *Quantum Information and Quantum Computation*, edited by C. Macchiavello, G. M. Palma, and A. Zeilinger (World Scientific, Singapore, 2000), pp. 195–198.] `quant-ph/9511010`.

35. C. A. Fuchs and C. M. Caves, "Mathematical Techniques for Quantum Communication Theory," *Open Systems & Information Dynamics* **3**(3), 345–356 (1995). `quant-ph/9604001`.

36. C. A. Fuchs and C. M. Caves, "Ensemble-Dependent Bounds for Accessible Information in Quantum Mechanics," *Physical Review Letters* **73**(23), 3047–3050 (1994).

37. H. Barnum, C. M. Caves, C. Fuchs, and R. Schack, "Comment on J. Lebowitz, 'Boltzmann's Entropy and Time's Arrow'," *Physics Today* **47**(11), 11–13 (1994).

38. C. Fuchs, "Aharonov-Casher Effect in Massive-Photon Electrodynamics," *Physical Review D* **42**(8), 2940–2942 (1990).

B. Publications in Books and Conference Proceedings

1. C. A. Fuchs and R. Schack, "Unknown Quantum States and Operations, a Bayesian View" in *Quantum Estimation Theory,* edited by M. G. A. Paris and J. Řeháček (Springer-Verlag, Berlin, 2004), pp. 151–190. `quant-ph/0404156`.
2. C. A. Fuchs and M. Sasaki, "The Quantumness of a Set of Quantum States," in *Proceedings of the Sixth International Conference on Quantum Communication, Measurement and Computing,* edited by J. H. Shapiro and O. Hirota (Rinton Press, Princeton, NJ, 2003), pp. 475–480. `quant-ph/0302108`.
3. C. A. Fuchs, "Quantum Mechanics as Quantum Information (and only a little more)," in *Quantum Theory: Reconsideration of Foundations,* edited by A. Khrennikov (Växjö University Press, Växjö, Sweden, 2002), pp. 463–543. `quant-ph/0205039`.
4. C. A. Fuchs, "The Anti-Växjö Interpretation of Quantum Mechanics," in *Quantum Theory: Reconsideration of Foundations,* edited by A. Khrennikov (Växjö University Press, Växjö, Sweden, 2002), pp. 99–116. `quant-ph/0204146`.
5. C. A. Fuchs, "Quantum Foundations in the Light of Quantum Information," in *Decoherence and its Implications in Quantum Computation and Information Transfer: Proceedings of the NATO Advanced Research Workshop, Mykonos Greece, June 25–30, 2000,* edited by A. Gonis and P. E. A. Turchi (IOS Press, Amsterdam, 2001), pp. 38–82. `quant-ph/0106166`.
6. C. A. Fuchs, "Quantum Channels," in *Quantum Information and Quantum Computation: Reprint Volume with Introductory Notes for ISI TMR Network School,* edited by C. Macchiavello, G. M. Palma, and A. Zeilinger (World Scientific, Singapore, 2000), pp. 157–160.
7. C. A. Fuchs, "Just *Two* Nonorthogonal Quantum States," in *Quantum Communication, Computing, and Measurement 2,* edited by P. Kumar, G. M. D'Ariano, and O. Hirota (Kluwer, Dordrecht, 2000), pp. 11–16. `quant-ph/9810032`.
8. S. J. van Enk and C. A. Fuchs, "Entanglement Is Super ... But Not Superluminal," in *Instantaneous Action at a Distance in Modern Physics: "Pro" and "Contra",* edited by A. E. Chubykalo, V. Pope, and R. Smirnov-Rueda (Nova Science Publishers, Commack, NY, 1999), pp. 407–411.
9. S. L. Braunstein, C. A. Fuchs, D. Gottesman, and H.-K. Lo, "A Quantum Analog of Huffman Coding," in *Proceedings 1998 IEEE International Symposium on Information Theory (MIT, Cambridge, MA USA, 16–21 August 1998),* (IEEE Information Theory Society, Cambridge, MA, 1998), p. 353.
10. C. H. Bennett, C. A. Fuchs, and J. A. Smolin, "Entanglement-Enhanced Classical Communication on a Noisy Quantum Channel," in *Quantum Communication, Computing and Measurement,* edited by O. Hirota, A. S. Holevo, and C. M. Caves (Plenum Press, NY, 1997), pp. 79–88. `quant-ph/9611006`.
11. C. A. Fuchs, "Information Gain vs. State Disturbance in Quantum Theory," in *PhysComp96: Proceedings of the Fourth Workshop on Physics and Computation (Boston University, 22–24 November 1996),* edited by T. Toffoli, M. Biafore, and J. Leão (New England Complex Systems Institute, Cambridge, MA, 1996), pp. 122–126. `quant-ph/9605014`.
12. C. M. Caves and C. A. Fuchs, "Quantum Information: How Much Information in a State Vector?," in *The Dilemma of Einstein, Podolsky and Rosen – 60 Years Later (An International Symposium in Honour of Nathan Rosen – Haifa, March 1995),* edited by A. Mann and M. Revzen, *Annals of The Israel Physical Society* **12**, 226–257 (1996). `quant-ph/9601025`.
13. C. A. Fuchs and C. M. Caves, "Bounds for Accessible Information in Quantum Mechanics," in *Fundamental Problems in Quantum Theory: A Conference Held in Honor of Professor John A. Wheeler,* edited by D. Greenberger and A. Zeilinger, *Annals of the New York Academy of Sciences* **755**, pp. 706–715 (1995).
14. C. Fuchs, "Landauer's Principle and Black-Hole Entropy," in *Workshop on Physics and Computation: PhysComp '92,* edited by D. Matzke (IEEE Computer Society, Los Alamitos, CA, 1993), pp. 86–92.
15. C. Fuchs, "Lagrangian Formulation of LAGEOS Spin Dynamics," in *Proceedings of the Air Force Office of Scientific Research Summer Research Program 1992,* (AFOSR, Washington, DC, 1992).

16. C. Fuchs, "Algorithmic Information Theory and the Hidden Variable Question," in *Workshop on Squeezed States and Uncertainty Relations, NASA Conference Publication* **3135**, edited by D. Han, Y. S. Kim, and W. W. Zachary (NASA, Washington, DC, 1992), pp. 83–85.

C. Books

1. C. A. Fuchs, *Notes on a Paulian Idea: Foundational, Historical, Anecdotal & Forward-Looking Thoughts on the Quantum***,** with foreword by N. David Mermin, (Växjö University Press, Växjö, Sweden, 2003). 718 pages. Also published in a 508-page format as `quant-ph/0105039`.
2. C. A. Fuchs, *Notes on a Paulian Idea: Foundational, Anecdotal & Forward-Looking Thoughts on the Quantum***,** with foreword by N. David Mermin, to appear in Springer's Fundamental Theories of Physics Series (Springer, Berlin, 2007). (This is a more fully indexed version of the previous.)

D. Other Book-Length Documents

1. C. A. Fuchs, *Distinguishability and Accessible Information in Quantum Theory***,** PhD thesis, University of New Mexico, Albuquerque, NM (1996). 174 pages. `quant-ph/9601020`.
2. C. A. Fuchs, *Quantum States: What the Hell Are They?***,** 229 pages. Available at my WWW homepage. (The format of this document is similar to the book in Section C, but more technical in content.)

E. Book Reviews, Essays, and Blurbs

1. C. A. Fuchs, "Asher Peres," *Foundations of Physics* **35**(11), 1785–1786 (2005).
2. M. Arndt, M. Aspelmeyer, H. J. Bernstein, R. Bertlmann, C. Brukner, J. P. Dowling, J. Eisert, A. Ekert, C. A. Fuchs, D. M. Greenberger, M. A. Horne, T. Jennewein, P. G. Kwiat, N. D. Mermin, J.-W. Pan, E. M. Rasel, H. Rauch, T. G. Rudolph, C. Salomon, A. V. Sergienko, J. Schmiedmayer, C. Simon, V. Vedral, P. Walther, G. Weihs, P. Zoller, M. Zukowski, "Quantum Physics from A to Z," to appear in *Proceedings of the Quantum Physics of Nature (QUPON) Conference, Vienna, Austria, May 22nd-26th, 2005,* edited by M. Arndt and G. Weihs. `quant-ph/0505187`.
3. C. A. Fuchs, "Advance Praise for 'Converging Realities'," on back cover of *Converging Realities: Toward a Common Philosophy of Physics and Mathematics,* by R. Omnès, (Princeton University Press, Princeton, 2005).
4. C. A. Fuchs, "Soul-Searching at Caltech," *Physics World* (November, 2003), p. 49.
5. C. A. Fuchs, "Book Review on 'Statistical Structure of Quantum Theory,' by Alexander S. Holevo," *Quantum Information and Computation* **3**(2), 191–192 (2003).
6. J. Bub and C. A. Fuchs, "Introduction: Special Issue on Quantum Information and Computation," *Studies in History and Philosophy of Modern Physics* **34**(3), 339–341 (2003).

F. Published Abstracts

1. M. Ban, C. A. Fuchs, O. Hirota, M. Osaki, and M. Sasaki, "Some Problems in Quantum Channel Capacity for Shannon Information," in *Quantum Algorithms: Dagstuhl Seminar Report 210,* edited by T. Beth and G. Brassard (Internationales Begegnungs- und Forschungszentrum für Informatik (IBFI), Wadern, Germany, 1998), p. 19.

G. Articles Submitted to Professional Journals

(Preprints available upon request.)

1. H. Barnum, C. A. Fuchs, J. M. Renes, and A. Wilce, "Influence-Free States on Compound Quantum Systems," submitted to *Physical Review A.* `quant-ph/0507108`.

H. Further Archived Materials

1. Most of the articles listed above can also be found (in preprint or early versions) at the arXiv.org ePrint Archive: `www.arxiv.org/archive/quant-ph`.
2. C. A. Fuchs, "The Structure of Quantum Information." Available at my WWW homepage.

3. C. A. Fuchs, "578 References for Research in Quantum Distinguishability and State Disturbance." Available at my WWW homepage.
4. I have written a handful of reviews for Quick Reviews in Quantum Computation and Information. They can be found at `http://quickreviews.org/qc/`.

I. Articles in Preparation

(Preliminary drafts available upon request.)

1. D. M. Appleby, H. B. Dang, and C. A. Fuchs, "Physical Significance of Symmetric Informationally Complete States," to be submitted to *Physical Review Letters*.
2. C. A. Fuchs, "Being Bayesian in a Quantum World," article requested by editors of *Scientific American*.
3. C. A. Fuchs, "The Activating Observer: Resource Material for a Paulian–Wheelerish Conception of Nature," presently 188 pages, to be submitted somewhere as a monograph.

INVITED LECTURES AND SEMINARS:

To the moment, I have given over 130 invited lectures and seminars—full list available upon request. Beyond the United States, this has allowed me the opportunity to visit Australia, Austria, Belgium, Canada, Denmark, England, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Japan, Mexico, The Netherlands, New Zealand, Northern Ireland, Poland, Portugal, Scotland, Spain, Sweden, Switzerland, and Wales.

A. Expository, Tutorial, and Summer-School Talks (selected)

Squire Public Lecture, Grinnell College, Grinnell, Iowa, 3 May 2006, "Quantum Information and the Reactive World."

Computing Beyond Silicon Summer School 2004, California Institute of Technology, Pasadena, California, 16–18 June 2004, "Introduction to Quantum Mechanics" and "Quantum Cryptography."

Instructional Course in Quantum Computing, Edinburgh, Scotland, 27–31 March 2000, course on "Quantum Communication."

TMR Network School on Quantum Computation and Quantum Information Theory, Villa Gualino, Turin, Italy, 12–23 July 1999, course on "Quantum Channels."

Physics Colloquium, Amherst College, Amherst, Massachusetts, 2 April 1999, "Quantum Teleportation: Using Entanglement as a Resource."

Physics Colloquium, Case Western Reserve University, Cleveland, Ohio, 5 February 1998, "Quantum Entanglement: What Good Is It?"

Michelson Lecture Series, Case Western Reserve University, Cleveland, Ohio, 2-6 February 1998, lectures on "Quantum Information Theory."

DIMACS Quantum Computing Tutorial and Workshop, Princeton University, Princeton, New Jersey, 11–15 August 1997, tutorials on "Basic Quantum Mechanics" and "Sending Classical Information on Quantum Channels."

B. Invited Research Talks (selected)

Quantum Reality, Relativistic Causality, and Closing the Epistemic Circle: An International Conference, Perimeter Institute of Theoretical Physics, Waterloo, Canada, 22 July 2006

Workshop on Quantum Mechanics: Axiomatics of Measurements and Connections with Computing and Information Retrieval, University of Pavia, Pavia, Italy, 25 June 2006

Quantum Computation and Information Seminar, Center for Logic and Computation, Technical University of Lisbon, Lisbon, Portugal, 31 March 2006

Applied Mathematics Colloquium, Princeton University, Princeton, NJ, 20 February 2006

36th Winter Colloquium on The Physics of Quantum Electronics, Snowbird, Utah, 5 January 2006

Physics Colloquium, College of William and Mary, Williamsburg, VA, 28 October 2005

Physics Colloquium, Dartmouth College, Hanover, NH, 30 September 2005

Twenty-Fifth International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering, San Jose, CA, 11 August 2005

Quantum Information, Computation and Logic: Exploring New Connections, Perimeter Institute of Theoretical Physics, Waterloo, Canada, 19 July 2005

J. T. Lewis Memorial Conference on Mathematics and Applications, Dublin, Ireland, 13 June 2005

Quantum Theory: Reconsideration of Foundations – 3, Växjö, Sweden, 4 June 2005

Quantum Physics of Nature & The 6th European Quantum Information Processing and Communication (QIPC) Workshop, Vienna, Austria, 23 May 2005

AMO Physics Seminar, University of Toronto, Toronto, Canada, 5 April 2005

II Sympozjum LFPPI Informatyki I Inżynierii Kwantowej, Wrocław University of Technology, Wrocław, Poland, 4 March 2005

Philosophy of Science Seminar, University of Maryland, College Park, MD, 16 December 2004

Quantum Physics Seminar, New York University, New York, NY, 13 December 2004

Summer Workshop: Time-Asymmetry and Quantum Reality, Sydney, Australia, 4 December 2004

Philosophy of Science Association Annual Meeting, Austin, TX, 20 November 2004

Seven Pines Symposium VIII: Quantum Mechanics, Quantum Information, and Quantum Computation, Minneapolis, Minnesota, 7 May 2004

New Directions in the Foundations of Physics, American Institute of Physics, College Park, Maryland, 30 April 2004

Seminar, Institut für Grenzgebiete der Psychologie und Psychohygiene, Freiburg, Germany, 1 April 2004

Physics Colloquium, University of British Columbia, Vancouver, Canada, 11 March 2004

Physics Colloquium, National University of Ireland, Maynooth, Ireland, 5 March 2004

Philosophy of Physics Research Seminar, Oxford University, Oxford, England, 19 February 2004

Probability in Quantum Mechanics, London School of Economics, London, England, 16 February 2004

AMO Physics Seminar, Niels Bohr Institute for Astronomy, Physics, and Geophysics, University of Copenhagen, Copenhagen, Denmark, 2 February 2004

Seminaire du Constitutions d'Objectivite, Centre de Recherches en Epistémologie Appliqué, Paris, France, 8 December 2003

European Science Foundation Conference on Philosophical and Foundational Issues in Statistical Physics, Utrecht, Netherlands, 30 November 2003

Physics Colloquium, Perimeter Institute for Theoretical Physics, Waterloo, Canada, 19 November 2003

Institute for Quantum Information Seminar Series, California Institute of Technology, Pasadena, California, 15 October 2003

Workshop on Quantum Measurements and Quantum Stochastics, University of Aarhus, Aarhus, Denmark, 7 August 2003

Dublin Theoretical Physics Colloquium, Trinity College, Dublin, Ireland, 6 October 2003

Mathematical Analysis of Quantum Systems, Dublin Institute for Advanced Studies, Dublin, Ireland, 2 October 2003

Quantum Mechanics On The Large Scale Exploratory Workshop, Peter Wall Institute of Advanced Studies, University of British Columbia, Vancouver, Canada, 21 April 2003

Communication Networks Research Institute, Dublin Institute of Technology, 27 March 2003

Physics Colloquium, City College of New York, New York, 4 December 2002 University of Copenhagen Mathematics Department Seminar, Copenhagen, Denmark, 13 September 2002

Quantum Lunch, Los Alamos National Laboratory, Los Alamos, NM, 29 August 2002

Feynman Festival, University of Maryland, College Park, MD, 23 August 2002

Sixth International Conference on Quantum Communication, Measurement and Computing, MIT, Cambridge, MA, 24 July 2002

International Conference on Quantum Information: Conceptual Foundations, Developments and Perspectives, Oviedo, Spain, 15 July 2002

Physics Seminar, Griffith University, Nathan, Australia, 13 June 2002

Center for Quantum Computer Technology Seminar, University of Queensland, Brisbane, Australia, 6 June 2002

Symmetries and Mysteries: A Symposium on the Occasion of David Mermin's Retirement, Cornell University, Ithaca, NY, 12 May 2002

AMO Physics Seminar, New York University, New York, NY, 17 April 2002

CNRI Quantum Information Theory Workshop, Dublin Institute of Technology, Dublin, Ireland, 22 March 2002

American Mathematical Society Meeting, Atlanta, Georgia, 8 March 2002

Research Seminar, Graduate School of Information Sciences, Tohoku University, Sendai, Japan, 22 February 2002

Workshop on Information Technology Solutions for Challenges Facing the 21st Century Army, National Defense University, Washington, DC, 14 November 2001

10th UK Conference on the Foundations of Modern Physics, Belfast, Ireland, 13 September 2001

Information Theory and Its Applications to Biology, Finance and Physics, Warsaw, Poland, 23 May 2001

American Mathematical Society Meeting, Hoboken, New Jersey, 28 April 2001

Research Program on Quantum Measurement and Information, Erwin Schrödinger International Institute for Mathematical Physics, Vienna, Austria, 8 December 2000

Mathematical Physics Seminar, Technical University of Budapest, Budapest, Hungary, 4 December 2000

Workshop on Quantum Computation and Information, California Institute of Technology, Pasadena, California, 15 November 2000

Annual Meeting, Optical Society of America, Rhode Island Convention Center, Providence, Rhode Island, 23 October 2000

Physics Colloquium, University of North Carolina, Chapel Hill, North Carolina, 29 September 2000

Fifth International Conference on Quantum Communication Measurement & Computing (QCMC-Y2K), Capri, Italy, 5 July 2000

NATO Advanced Research Workshop on Decoherence and its Implications in Quantum Computation and Information Transfer, Mykonos, Greece, 26 June 2000

Department of Applied Mathematics, University of Bristol, Bristol, England, 7 June 2000

Bell Labs, Lucent Technologies, Murray Hill, New Jersey, 31 May 2000

952nd American Mathematical Society Meeting, University of Massachusetts Lowell, Lowell, Massachusetts, 1 April 2000

Quantum Communication Seminar, Tamagawa University, Tokyo, Japan, 8–9 March 2000

Physics Colloquium, Technion–Israel Institute of Technology, Haifa, Israel, 24 February 2000

Symposium on Quantum Information Theory, Technion–Israel Institute of Technology, Haifa, Israel, 21 February 2000

Physics Colloquium, Amherst College, Amherst, Massachusetts, 10 February 2000

American Mathematical Society Annual Meeting, Washington, DC, 19 January 2000

Chance in Physics: Foundations and Perspectives, Istituto Italiano Per Gli Studi Filosofici, Ischia, Naples, Italy, 29 November 1999

Second Workshop on Fundamental Problems in Quantum Theory, Baltimore, Maryland, 9 August 1999

Workshop on Complexity, Computation and the Physics of Information, Isaac Newton Institute, Cambridge, England, 9 July 1999

Electrical Engineering and Computer Science Special Seminar, Massachusetts Institute of Technology, Cambridge, Massachusetts, 15 March 1999

Microsoft Research Seminar, Redmond, Washington, 22 February 1999

AMO Physics Seminar, University of Wisconsin at Madison, Madison, Wisconsin, 11 February 1999

Southwest Quantum Information and Technology (SQUINT) Network Kickoff Meeting, Almaden, California, 17 December 1998

Information Physics Seminar, University of New Mexico, Albuquerque, New Mexico, 29 October 1998

Progress in Quantum Computing, Cryptography and Communication, Benasque Center for Physics, Benasque, Spain, July 1998

Quantum Algorithms, International Conference and Research Center for Computer Science, Schloss Dagstuhl, Germany, May 1998

Seminar, Max Planck Institute for Quantum Optics, Garching, Germany, 7 April 1998

Quantum Communication Seminar, Tamagawa University, Tokyo, Japan, 7 March 1998

NASA International Conference on Quantum Computing & Quantum Communication(QCQC'98), 18 February 1998, Palm Springs, California

IBM Research Division Physics Seminar, Yorktown Heights, New York, 9 February 1998

Electrical and Computer Engineering Seminar, University of California at Los Angeles, Los Angeles, California, 3 October 1997

Royal Holloway College Physics Seminar, London, England, 19 September 1997

Workshop on Quantum Computation 1997, Institute for Scientific Interchange, Turin, Italy, 30 June 1997

First Killam Workshop on Quantum Information Theory, Université de Montréal, Montréal, Canada, 27 May 1997

Atomic Physics Seminar, The University of Texas, Austin, Texas, 15 May 1997

Mini-Workshop on Information Physics, Center for Advanced Studies, University of New Mexico, Albuquerque, New Mexico, 30 April 1997

AT&T Seminar on Quantum Computation and Error Correction, AT&T Bell Labs, Murray Hill, New Jersey, 19 March 1997

Physics Seminar, University of Innsbrück, Innsbrück, Austria, 23 December 1996

Quantum Information and Computation (QUIC) Institute Workshop for DARPA and ARO, California Institute of Technology, Pasadena, California, 13 November 1996

Research Program on Quantum Computers and Quantum Coherence, Institute for Theoretical Physics, Santa Barbara, California, October 1996

Third International Conference on Quantum Communication and Measurement, Tamagawa University, Tokyo, Japan, 27 September 1996

IBM Research Division Physics Seminar, Yorktown Heights, New York, 31 July 1996

Workshop on Quantum Computation 1996, Institute for Scientific Interchange, Turin, Italy, 1 July 1996

Physics Colloquium, Parks College of St. Louis University, St. Louis, Missouri, 17 May 1996

Workshop on Quantum Computation 1995, Institute for Scientific Interchange, Turin, Italy, 3 July 1995

Los Alamos National Laboratory "Quantum Lunch," Los Alamos, New Mexico, 27 January 1995

Workshop on Quantum Computation, Institute for Scientific Interchange, Turin, Italy, 31 October 1994

Clarendon Laboratory Theoretical Physics Seminar, Oxford University, Oxford, England, 21 July 1994

Imperial College of Science, Technology and Medicine Theoretical Physics Seminar, London, England, 20 July 1994

Third Santa Fe Workshop on Complexity, Entropy, and Physics of Information, Santa Fe, New Mexico, 19 May 1994

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