

CURRICULUM VITAE

Robbert Dijkgraaf

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Personal Information

- Robertus Henricus Dijkgraaf.
Born Jan 24, 1960, Ridderkerk, The Netherlands.
- Married to Maria Pia de Jong, psychologist (Sep 7, 1989).
- Father of Jurriaan Pieter (Oct 11, 1996), Matthijs Roemer (Jul 25, 1998), Charlotte Sophie (Jul 28, 2000).

Education

- Gymnasium Erasmianum, Rotterdam, 1972–1978.
- B.A. in Physics (*cum laude*), Utrecht University, 1982.
- Gerrit Rietvelt Academie, Amsterdam (art school, speciality: painting), 1982–1984.
- M.A. Theoretical Physics (*cum laude*), Institute for Theoretical Physics, Utrecht University, 1986.
- Ph.D. (*cum laude*), Utrecht University, 1989. *A Geometrical Approach to Two Dimensional Conformal Field Theory*, advisor Prof. dr. G. 't Hooft.

Employment

- Teaching Assistantships, Department of Physics, Utrecht University, 1981–1986.

- ‘Promovendus,’ Stichting voor Fundamenteel Onderzoek FOM, Institute for Theoretical Physics, Utrecht University, 1986–1989.
- Research Associate, Physics Department, Princeton University, 1989–1991.
- Long-Term Member, School of Natural Sciences, Institute for Advanced Study, Princeton, 1991–1992.
- Professor of Mathematical Physics, Department of Mathematics, University of Amsterdam, 1992–.
- Faculty Professor, Faculty of Science, University of Amsterdam, 1998–.

Visiting Positions

- Visiting Scientist, Hebrew University, Jerusalem, Apr-May 1990.
- Visiting Scholar, Institute for Theoretical Physics, Santa Barbara, Fall 1990.
- Visiting Professor, Department of Physics, Rutgers University, Spring 1993.
- Visiting Scholar, Mathematical Sciences Research Institute, UC Berkeley, Spring 1994.
- Visiting Scientist, RIMS, Kyoto University, Jun–Jul 1994.
- Visiting Professor, Tata Institute for Fundamental Research, Bombay, Dec 1994–Jan 1995.
- Visiting Scholar, Institute for Theoretical Physics, Santa Barbara, Spring 1998.
- Visiting Professor, Mathematics Department, MIT, Mar-May 1999.
- Visiting Scholar, Institute for Theoretical Physics, Santa Barbara, Jul-Sep 1999.
- Visiting Scholar, School of Natural Sciences, Institute for Advanced Study, Princeton, Spring 2000.
- Visiting Scholar, Institute for Theoretical Physics, Santa Barbara, Mar-May 2001.
- Visiting Scholar, School of Natural Sciences, Institute for Advanced Study, Princeton, Spring 2002.
- Other shorter visiting positions: Newton Institute Cambridge, Paris (Saclay, IHES, ENS), ICTP Trieste, ETH Zurich, Harvard, Chicago, Tokyo, Singapore.

Honors, Prizes

- Donegall Lecturer (1688), Trinity College, Dublin, 1999.
- Physica-prijs 2002, Nederlandse Natuurkundige Vereniging.

- Witthaker lecture, Edinburg, May 2002.
- Floer Memorial Lecture, Stanford, Sep 2002.

Research Interests

Physics

String theory, quantum gravity, black holes, conformal and topological field theory, supersymmetric gauge theory.

Mathematics

Mathematical aspects of quantum field theory, in particular applications to algebraic geometry, enumerative geometry, moduli spaces, differential topology, manifold invariants, knot theory, representation theory, modular forms, group theory, dynamical systems.

Teaching Experience

Various courses at Mathematics and Physics Department, from freshman till advanced graduate courses.

Topics among others: differential geometry, symplectic geometry, dynamical systems, mathematical physics, solitons in field theory, Hamiltonian mechanics for mathematicians, localisation in equivariant cohomology, topological field theory, four-dimensional topology and gauge theory, conformal field theory, symmetry and group theory, string theory, quantum gravity.

Organisation of Conferences, Workshops, Summer Schools

- JAMI conference on *Geometry and Quantum Field Theory*, The John Hopkins University, Baltimore, Mar 26–29, 1992.
- Trieste Spring School and Workshop '93, *String Theory, Gauge Theory and Quantum Gravity*, ICTP, Trieste, Apr 19–29, 1993.
- Instructional conference on *Moduli Space of Algebraic Curves*, Lunteren, 6-8 Dec 1993.
- Trieste Spring School and Workshop '94, *String Theory, Gauge Theory and Quantum Gravity*, ICTP, Trieste, Apr 11–22, 1994.
- 2nd Texel Conference on *The Moduli Space of Curves*, Texel, Holland, Apr 1994.
- Conference on *Mathematical Aspects of Quantum Field Theory*, ICTP, Trieste, Mar 1995.
- Trieste Spring School and Workshop '95, *String Theory, Gauge Theory and Quantum Gravity*, ICTP, Trieste, Mar 27–Apr 7, 1995.

- Trieste Spring School and Workshop '96, *String Theory, Gauge Theory and Quantum Gravity*, ICTP, Trieste, Mar 18–27, 1996.
- Workshop on *Duality in Physics and Mathematics*, Aspen Center for Physics, Jul 22–Aug 18, 1996.
- Conference *Strings '97*, Amsterdam, Jun 16–20, 1997.
- Symposium *Gravity, Black Holes and Strings*, Amsterdam, Jun 21, 1997.
- Amsterdam Summer Workshop, *Gauge Theory, Gravity and Strings*, Jul 1998.
- Amsterdam Summer Workshop, *Gauge Theory, Gravity and Strings*, Jul 1999.
- Duality Workshop, Institute for Theoretical Physics, UC Santa Barbara, Aug 1999.
- Workshop, *Non-Commutative Gauge Theory*, Lorentz Center, Leiden, Nov 22–26, 1999.
- Amsterdam Summer Workshop, *Gauge Theory, Gravity and Strings*, Jul 2001.
- Programme on *M-Theory*, Isaac Newton Institute for Mathematical Sciences, Cambridge University, Feb 4–Jul 19, 2002.
- Clay Mathematics Institute School on Geometry and M-Theory, Cambridge University, Mar 25–Apr 19, 2002.
- Amsterdam Summer Workshop, *String Theory and Quantum Gravity*, July 2002.
- Workshop, *Branes and Cosmology*, Lorentz Center, Leiden, Nov 18–22, 2002.
- School on *Mathematics in String and Field Theory*, ICTP, Trieste, June 2–13, 2003.
- Amsterdam Summer Workshop, *String Theory and Quantum Gravity*, June 2003.
- Mathematics and Physics Workshop, Institute for Theoretical Physics, UC Santa Barbara, July-Aug 2003.

Editorships

- *Communications in Mathematical Physics*, Managing Editor of section *String theory, conformal field theory*, 1992–
- *Nuclear Physics B*, Supervisory Editor, 1994–
- *Journal of Geometry and Physics*, 1995–
- *Advances in Theoretical and Mathematical Physics*, 1997–
- *International Mathematical Research Notices*, 1998–
- *Journal of Mathematical Physics*, 2000–

- *Reviews of Mathematical Physics*, 2000–
- Member editorial board of several book series (Elsevier Mathematical Library, Springer)
- *Academische Boekengids*, Amsterdam University Press, 2001–.

Supervised Ph.D. Students

- Christoph Schweigert, *Galois and Simple Current Symmetries in Conformal Field Theory*, Jun 15, 1995, University of Amsterdam, copromotor: dr. J. Fuchs (NIKHEF)
- Olivier de Mirleau, *Foundations of functional integration and the Schwinger-Dyson equation*, Jan 7, 1997, University of Amsterdam, copromotor: dr. H. G. J. Pijls.
- Dimitri Neumann, *Strings, Algebras and Automorphic Forms*, Mar 13, 1998, University of Amsterdam.
- Marcel Vonk, projected 2002 (with E. Verlinde).
- Daniel Grünberg, projected 2003.
- Luca Tomassini, projected 2004.
- Simon Kronemeijer, projected 2004 (with G. van der Geer).
- Mine Temürhan, projected 2005.

Memberships, Committees, etc.

Scientific

- Director, Spring School, ICTP, Trieste, Italy, 1992–1996.
- Member Advisory Committee *International Workshops on Algebraic Geometry and Physics*, 1996–.
- Member, Executive Board, Dutch Mathematical Physics Society, 1996–1999.
- Chair, Executive Board, Dutch Mathematical Physics Society, 1999–.
- Member, Scientific Steering Committee, Isaac Newton Institute for Mathematical Sciences, Cambridge University, 1999–2002.
- Member, Scientific Steering Committee, Max-Planck-Institut für Mathematik, Bonn, 2001–.
- Chair, Program Committee Mathematical Physics, International Congress of Mathematics, Beijing, 1999-2000.
- External Assessor, Chair of Natural Philosophy, Trinity College Dublin, 2000.

- Member, Scientific Steering Committee Mathematics, Lorentz Center, Leiden University, 1999–.
- Member, Scientific Steering Committee Physics, Lorentz Center, Leiden University, 1999–.
- Member, Evaluation Committee Erwin Schroedinger Institut für Mathematische Physik, Vienna.
- Member, International Advisory Committee, Strings 2001, Tata Institute, Mumbai.
- Member, International Advisory Committee, Strings 2002, Cambridge University.
- Member, International Advisory Committee, Strings 2003, Kyoto.
- Member, American Physical Society.
- Member, American Mathematical Society.
- Member, International Association for Mathematical Physics.

Administrative

- Member, Research Committee, Faculty of Mathematics and Computer Science, University of Amsterdam, 1992–1994.
- Chair, Curriculum Committee, Department of Mathematics, University of Amsterdam, 1994–
- Chair, Teaching Committee, Department of Mathematics, University of Amsterdam, 1994–1997.
- Chair, Search Committee, Chair in Applied Analysis and Dynamical Systems, University of Amsterdam, 1997.
- Member, Junior Faculty Search Committee, Spinoza Institute, Utrecht University, 2000.
- Member, Search Committee, Chair in High Energy Astrophysics, University of Amsterdam, 2000–2001.
- Chair, Programme Management, FOM-GBE Programme *Mathematical Physics*, 1999–.
- Programme Manager, FOM Programme *String Theory and Quantum Gravity*, 2001–.

Research Grants

- FOM-SMC Mathematical Physics project *Topological Field Theory, String Theory and the Geometry of Moduli Space*, 1992.

- SWON Programme *Riemann surfaces and algebraic curves*, 1994 (with C. Faber, G. van der Geer, E. Looijenga, F. Oort)
- SWON project, *String Duality*, 1996.
- FOM project *Nonperturbative String Theory*, 1997 (with E. Verlinde and H. Verlinde).
- FOM-SWON Mathematical Physics project *Extended Objects in Mathematics and Physics*, 1997 (with E. Verlinde).
- FOM-GBE Programme *Mathematical Physics*, 1999 (with F. den Hollander, M. Winnink, F. Takens).
- FOM project *Strings, Black Holes and Holography*, 2000 (with J. de Boer)
- FOM-GBE Mathematical Physics project, *Mirror Symmetry: algebraic, geometric and arithmetic aspects*, 2000 (with G. van der Geer).
- FOM Programme *String Theory and Quantum Gravity*, 2001 (with J. de Boer, B. de Wit, G. 't Hooft, E. Bergshoeff, B. Schellekens).
- FOM project *Holography and Topological Invariants*, 2001 (with J. de Boer).
- FOM project *String Theory and Cosmology*, 2001 (with J. de Boer).

Publications

Scientific Papers

1. R. Dijkgraaf, E. Verlinde, and H. Verlinde, *$c = 1$ Conformal Field Theories on Riemann Surfaces*, Commun. Math. Phys. **115** (1988).
2. R. Dijkgraaf, E. Verlinde, and H. Verlinde, *Conformal Field Theory at $c = 1$* , in “Nonperturbative Quantum Field Theory,” Proceedings of the 1987 Cargèse Summer School, G. 't Hooft et al. eds. (Plenum, New York, 1988) 577–590.
3. R. Dijkgraaf, E. Verlinde, and H. Verlinde, *On Moduli Spaces of Conformal Field Theories with $c \geq 1$* , in “Perspectives in String Theory,” P. Di Vecchia and J.L. Petersen eds. (World Scientific, 1988) 117–137.
4. R. Dijkgraaf and E. Verlinde, *Modular Invariance and the Fusion Algebra*, Nucl. Phys. **B** (Proc. Suppl.) **5B** (1988) 87.
5. R. Dijkgraaf, *Recent Progress in Rational Conformal Field Theory*, in Les Houches, Session XLIX, 1988, “Fields, Strings and Critical Phenomena,” E. Brézin and J. Zinn-Justin eds. (Elsevier 1990), 291–304.
6. R. Dijkgraaf, C. Vafa, E. Verlinde, and H. Verlinde, *Operator Algebra of Orbifold Models*, Commun. Math. Phys. **123** (1989) 485.
7. R. Dijkgraaf and E. Witten, *Topological Gauge Theories and Group Cohomology*, Commun. Math. Phys. **129** (1990) 393.

8. R. Dijkgraaf, V. Pasquier, and Ph. Roche, *Quasi-Quantum Groups Related to Orbifold Models*, in the Proceedings of the “International Colloquium on Modern Quantum Field Theory,” Tata Institute of Fundamental Research, 375–383.
9. R. Dijkgraaf, V. Pasquier, and Ph. Roche, *Quasihopf Algebras, Group Cohomology and Orbifold Models*, in Annecy 1990, “Recent advances in field theory,” Nucl. Phys. Proc. Suppl. 18B (1990) 60–72, in Pavia 1990, “Integrable systems and quantum groups,” 75–98.
10. R. Dijkgraaf and E. Witten, *Mean Field Theory, Topological Field Theory, and Multi-Matrix Models*, Nucl. Phys. **B342** (1990) 486.
11. R. Dijkgraaf, E. Verlinde, and H. Verlinde, *Loop Equations and Virasoro Constraints in Non-Perturbative 2-D Quantum Gravity*, Nucl. Phys. B **B348** (1991) 435–456.
12. R. Dijkgraaf, E. Verlinde, and H. Verlinde, *Topological Strings in $d < 1$* , Nucl. Phys. **B352** (1991) 59–86.
13. R. Dijkgraaf and H. Verlinde, *Topological Strings and Loop Equations*, in the Proceedings of the Workshop on “Random Surfaces, Quantum Gravity and Strings,” Cargèse 1990 (Plenum Press, 1991), 53–76.
14. R. Dijkgraaf, E. Verlinde, and H. Verlinde, *Notes on Topological String Theory and 2D Gravity*, in “String Theory and Quantum Gravity,” Proceedings of the Trieste Spring School 1990, Eds. M. Green et al. (World-Scientific, 1991), 91–156.
15. R. Dijkgraaf, E. Verlinde, and H. Verlinde, *String Propagation in a Black Hole Geometry*, Nucl. Phys. **B 371** (1992) 269–314.
16. R. Dijkgraaf, *Topological Field Theory and 2D Quantum Gravity*, Proceedings of the Winter School on “2D Quantum Gravity and Random Surfaces,” Jerusalem 1990/91, 191–238.
17. R. Dijkgraaf, *Intersection Theory, Integrable Hierarchies and Topological Field Theory*, in “New Symmetry Principles in Quantum Field Theory,” Ed. Mack (Plenum, 1993) 95–158, [arXiv:hep-th/9201003].
18. R. Dijkgraaf, G. Moore, and R. Plesser, *The Partition Function of 2d String Theory*, Nucl.Phys. **B349** (1993) 356–382, [arXiv:hep-th/9208031].
19. R. Dijkgraaf, *Integrable Hierarchies and Quantum Gravity*, in “Geometric and Quantum Aspects of Integrable Systems,” Ed. G.F. Helminck (Springer-Verlag, 1993) 67–89.
20. R. Dijkgraaf, *Introduction to Topological Field Theory*, in TASI 1992, “Recent Directions in Particle Theory,” (1993) 689–743.
21. R. Dijkgraaf, *Integrable Hierarchies and $c = 1$ String Theory*, in Rome 1992, “String Theory, Quantum Gravity and the Unification of the Fundamental Interactions” (1993) 161–182.

22. R. Dijkgraaf, *Perturbative Topological Field Theory*, in “String Theory, Gauge Theory and Quantum Gravity,” Trieste Spring School and Workshop 1993, Eds. R. Dijkgraaf et al. (World Scientific, 1994).
23. R. Dijkgraaf, *Mirror Symmetry and Elliptic Curves*, in “The Moduli Space of Curves,” Eds. R. Dijkgraaf, C. Faber and G. van der Geer (Birkhäuser, 1995).
24. R. Dijkgraaf, *Lectures on Four-Manifolds and Topological Gauge Theories*, in Nucl. Phys. B (Proc. Suppl.) **45B,C** (1996) 29-45, and in “Gauge Theories, Applied Supersymmetry, Quantum Gravity” Eds. B. de Wit et al., (Leuven Notes in Mathematical and Theoretical Physics, Vol. 6).
25. R. Dijkgraaf, E. Verlinde, and H. Verlinde, *BPS Spectrum of the Five-Brane and Black Hole Entropy*, Nucl. Phys. **B486** (1997) 77–88, [arXiv:hep-th/960312].
26. R. Dijkgraaf, E. Verlinde, and H. Verlinde, *BPS Quantization of the Five-brane*, Nucl. Phys **B486** (1997) 89–113, [arXiv:hep-th/9604055].
27. R. Dijkgraaf, E. Verlinde, and H. Verlinde, *Counting Dyons in $N=4$ String Theory*, Nucl. Phys. **B484** (1997) 543–561, [arXiv:hep-th/9607026].
28. R. Dijkgraaf, G. Moore, E. Verlinde, and H. Verlinde, *Elliptic Genera of Symmetric Products and Second Quantized Strings*, Commun. Math. Phys. **185** (1997) 197–209, [arXiv:hep-th/9608096].
29. R. Dijkgraaf and G. Moore, *Balanced Topological Field Theories*, Commun. Math. Phys. **185** (1997) 411–440, [arXiv:hep-th/9608169].
30. R. Dijkgraaf, *Chiral Deformations of Conformal Field Theories*, Nucl. Phys. **B493** [FS] (1997) 588–612, [arXiv:hep-th/9609022].
31. R. Dijkgraaf, E. Verlinde, and H. Verlinde, *Matrix String Theory*, Nucl. Phys. **B500** (1997) 43–61, [arXiv:hep-th/9703030].
32. R. Dijkgraaf, *Les Houches Lectures on Fields, Strings and Duality*, in “Quantum Symmetries,” Les Houches LXIV, 1995, Eds. A. Connes, K. Gawedzki, J. Zinn-Justin Elsevier, Amsterdam, 1998, 3–147, [arXiv:hep-th/9703136].
33. R. Dijkgraaf, E. Verlinde, and H. Verlinde, *5D Black Holes and Matrix Strings*, Nucl. Phys. **B506** (1997) 121–142, [arXiv:hep-th/9704018].
34. R. Dijkgraaf, E. Verlinde, and H. Verlinde, *Notes on Matrix and Micro Strings*, Nucl. Phys. Proc. Suppl. **62** (1998) 348, [arXiv:hep-th/9709107].
35. R. Dijkgraaf, J.-S. Park, and B.J. Schroers, *$N=4$ Supersymmetric Yang-Mills Theory on a Kaehler Surface*, [arXiv:hep-th/9801066].
36. R. Dijkgraaf, *The Mathematics of Fivebranes*, International Congress of Mathematicians (ICM 98), Berlin, Germany, Doc. Math. J. DMV, 1999.
37. R. Dijkgraaf, *Instanton Strings and HyperKaehler Geometry*, Nucl. Phys. B **543** (1999) 545, hep-th/9810210.

38. R. Dijkgraaf, *Lectures on Four-Manifolds And Topological Gauge Theories*, Nucl. Phys. Proc. Suppl. **45B** (1996) 29.
39. R. Dijkgraaf, *On the D1-D5 conformal field theory*, Classical Quantum Gravity 17 (2000), 1035-1048.
40. R. Dijkgraaf, *Strings, Matrices And Black Holes*, in Fre, P. (ed.) et al.: *Classical and Quantum Black Holes*, 77-136.
41. R. Dijkgraaf, *Fields, strings, matrices and symmetric products*, in *Moduli of Curves and Abelian Varieties*, The Dutch Intercity Seminar on Moduli, C. Faber and E. Looijenga (eds.), Vieweg, Aspects of Mathematics E33, 1999, 151–199, hep-th/9912104.
42. R. Dijkgraaf, *The Mathematics of M-Theory*, Proceedings of the 3rd European Congress of Mathematics, Barcelona, 2000, Progress in Mathematics, Birkhuser Verlag.
43. R. Dijkgraaf, *Discrete Torsion and Symmetric Products*, [arXiv:hep-th/9912101].
44. R. Dijkgraaf, J. Maldacena, G. Moore, and E. Verlinde, *A Black Hole Farey Tail*, [arXiv:hep-th/005003].
45. J. de Boer, R. Dijkgraaf, K. Hori, A. Keurentjes, J. Morgan, D. R. Morrison, and S. Sethi, *Triples, Fluxes, and Strings*, Adv. Theor. Math. Phys. **4** (2002) 995–1186, [arXiv:hep-th/0103170].
46. C. Bachas, J. d. Boer, R. Dijkgraaf, and H. Ooguri). *Permeable Conformal Walls and Holography*, JHEP **0206** (2002) 027 [arXiv:hep-th/0111210].
47. R. Dijkgraaf, E. Verlinde, and M. Vonk, *On the partition sum of the NS five-brane*, [arXiv:hep-th/0205281].
48. R. Dijkgraaf and C. Vafa, *Matrix Models, Topological Strings, and Supersymmetric Gauge Theories*, Nucl. Phys. **B644** (2002) 3–20, [arXiv:hep-th/0206255].
49. R. Dijkgraaf and C. Vafa, *On Geometry and Matrix Models*, Nucl. Phys. **B644** (2002) 21–39, [arXiv:hep-th/0207106].
50. R. Dijkgraaf and C. Vafa, *A Perturbative Window into Non-Perturbative Physics*, [arXiv:hep-th/0208048].
51. R. Dijkgraaf, S. Gukov, V.A. Kazakov, C. Vafa, *Perturbative Analysis of Gauged Matrix Models*, [arXiv:hep-th/0210238].
52. R. Dijkgraaf, M.T. Grisaru, C.S. Lam, C. Vafa, D. Zanon, *Perturbative Computation of Glueball Superpotentials*, [arXiv:hep-th/0211017].
53. R. Dijkgraaf, A. Sinkovics, and M. Temürhan, *Matrix Models and Gravitational Corrections*, [arXiv:hep-th/0211241].

Thesis, Proceedings Volumes, Books

1. *A Geometrical Approach to Two Dimensional Conformal Field Theory*, Ph.D. thesis (Utrecht, 1989).
2. *String Theory, Gauge Theory and Quantum Gravity*, Trieste Spring School and Workshop 1993, Eds. R. Dijkgraaf et al. (World Scientific, 1994).
3. *String Theory, Gauge Theory and Quantum Gravity*, Trieste Spring School and Workshop 1994, Eds. R. Dijkgraaf et al., Nucl. Phys. B, Proc. Suppl. **41** (1995).
4. *String Theory, Gauge Theory and Quantum Gravity*, Trieste Spring School and Workshop 1995, Eds. R. Dijkgraaf et al., Nucl. Phys. B (Proc. Suppl.) **45B,C** (1996).
5. *The Moduli Space of Curves*, Eds. R. Dijkgraaf, C. Faber and G. van der Geer (Birkhäuser, 1995).
6. *String Theory, Gauge Theory and Quantum Gravity*, Trieste Spring School and Workshop 1996, Eds. R. Dijkgraaf et al., Nucl. Phys. B (Proc. Suppl.) (1997).
7. *Strings 97*, Proceedings of the International Conference Strings 97, Amsterdam, 16-21 Jun, 1997. Eds: F.A. Bais, E.A. Bergshoeff, B. de Wit, R. Dijkgraaf, A.N. Schellekens, E.P. Verlinde and H.L. Verlinde, Nucl. Phys. B (Proc. Suppl) **68** (1998)

Popular publications

1. *Een Nieuwe Revolutie in Stringtheorie*, *Afleiding* **1** (1996) 7–11.
2. *De Onredelijke Effektiviteit van de Fysica in de Moderne Wiskunde*, *Ned. Tijds. v. Nat.* **62/11** (1996) 255–257.
3. *Het Witten vermoeden*, Jaarverslag SMC 1995.
4. *Einsteins droom en de wiskundige werkelijkheid*, Diesrede 8 januari 1999, Univ. van Amsterdam, Vossiuspers AUP, Amsterdam, 1999.
5. *Gevangen in een vliegend tapijt*, *NRC-Handelsblad*, 22 april 2000.
6. *Non-Commutative geometry and D-branes*, FOM Jaarboek, 2000.
7. *Zegentocht van de snaren*, *Academische Boekengids* 33, juni 2002.
8. *Snaartheorie en quantumgravitatie*, *Physica-lezing* 2002, *Nederlands Tijdschrift voor Natuurkunde* 68/5, mei 2002.
9. *Hoe wiskunde werkt: van natuur tot cognitie*, to be published, Amsterdam University Press, 2003 (with J. van Benthem).

Selected Invited Lectures at Conferences and Workshops

- Les Houches 1988, *Fields, Strings and Critical Phenomena*, Les Houches, France, Jun 28–Aug 5, 1988.

- Workshop on *Conformal Field Theory*, Max Planck Institute for Mathematics, Bonn, May, 1989.
- Workshop on *Geometry and Quantum Field Theory*, Aspen Center for Physics, Aug, 1989.
- Cargese Workshop on *Random Surfaces, Quantum Gravity and Strings*, Cargese, France, May 28 - Jun 1, 1990.
- Santa Barbara Workshop on *Conformal Field Theory*, ITP, UC Santa Barbara, Aug-Sep, 1990.
- 8th Winter School for Theoretical Physics, *Two Dimensional Quantum Gravity and Random Surfaces*, Jerusalem, Dec 27, 1990 – Jan 4, 1991.
- MSRI Workshop on *Random surfaces and matrix models*, Berkeley, Mar 1991.
- Cargese Summer School on *New Symmetry Principles in Quantum Field Theory*, Cargese, France, Jul 16-27, 1991.
- TASI Summer Institute, *Recent directions in particle theory*, Boulder, Colorado, Jun, 1992.
- *Quantum Field Theory*, Ascona, Aug 1992.
- Conference on *Geometric and quantum aspects of integrable systems*, Scheveningen, Sep, 1992.
- Workshop on *Integrable Quantum Field Theories*, Como, Italy, Sep 14–19, 1992.
- International Workshop on *String Theory, Quantum Gravity and the Unification of Fundamental Interactions*, Rome, Sept 21–26, 1992.
- Workshop on *Conformal Field Theory*, Isaac Newton Institute, Cambridge, Dec, 1992.
- Workshop on *the Topology and Hodge Theory of Singularities*, Mathematical Institute, Utrecht, Dec 10–12, 1992.
- Annual UK Particle Physics Theory Meeting, Rutherford Appleton Laboratory, Oxford, Dec 16–18 1992.
- Les Journées Relativistes, Brussels, 1993.
- Triangle Meeting, Utrecht, 1993.
- Dutch Mathematical Congress, Amsterdam, 1993.
- Conference on *Geometrical and Topological Methods in Theoretical Physics*, Lyon, 1993.
- *Geometric Aspects of Infinite Analysis*, Kyoto–Kinosaki, Japan, Jun, 1993.
- MSRI, workshop on *Geometry and Quantum Field Theory*, Berkeley, Jan, 1993

- Trieste Spring School and Workshop, *String Theory, Gauge Theory and Quantum Gravity*, ICTP, Trieste, Apr 19–29, 1993.
- Trieste Spring School and Workshop, *String Theory, Gauge Theory and Quantum Gravity*, ICTP, Trieste, Apr 11–22, 1994
- Erasmus meeting, *Quantum Field Theory*, Heraclion, Crete, May, 1994.
- Symposium *Mathematical Physics*, Jun 9–10, 1994.
- *Geometry and Quantum Field Theory*, ICTP, Trieste, Mar, 1995
- Trieste Spring School and Workshop, *String Theory, Gauge Theory and Quantum Gravity*, ICTP, Trieste, Mar 27–Apr 7, 1995.
- *Gauge Theories, Applied Supersymmetry and Quantum Gravity*, Leuven, Jul, 1995.
- Cargese 1995, *Low dimensional applications of quantum field theory*, Jul 11–29, 1995.
- Les Houches 1995, Summer School on Theoretical Physics, Session LXIV, *Quantum Symmetries*, Les Houches, France, Aug 1–Sep 8, 1995.
- Trieste Spring School and Workshop, *String Theory, Gauge Theory and Quantum Gravity*, ICTP, Trieste, Mar 18–27, 1996.
- Workshop on *Duality in Physics and Mathematics*, Aspen Center for Physics, Aug, 1996.
- Newton Insitute, *Four-dimensional Topology and Quantum Field Theory*, Dec, 1996.
- Fourth Irish Quantum Field Theory Meeting, Dublin, May 23–24, 1997.
- Cargese 1997, *Recent developments in superstring duality and supersymmetric field theory*, May 26–Jun 14, 1997.
- Conference *Strings '97*, Amsterdam, Jun 16–21, 1997.
- Vith Oporto Meeting on *Geometry, Topology and Physics*, Oporto, Jul 4–7, 1997.
- Workshop on *Supersymmetry and Nonperturbative Quantum Geometry*, Aspen Center for Physics, Jul 12–Aug 8, 1997.
- Eighteenth UK Institute for Theoretical High Energy Physists, University of St. Andrews, Scotland, Aug 25–Sep 12, 1997.
- 1997 Summer Workshop on Algebraic Geometry and Physics, Medina del Campo, Spain, Sep 16–20, 1997.
- Geometry and Duality program, ITP, Santa Barbara, Jan 12–Feb 20, 1998.
- Invited lecture, International Congress of Mathematicians, Berlin, Aug 1998.
- *Strings, Branes and Gravity*, TASI 99, Boulder, Colorado, May 31–Jun 25, 1999.

- Conference *Strings '99*, Potsdam, Jul 19–24, 1999.
- Geometry and Duality program, ITP, Santa Barbara, Aug 1999.
- Supersymmetric Gauge Theories program, ITP, Santa Barbara, Sep 1999.
- Plenary lecture, *String Theory at The Millennium*, Caltech, Jan 2000.
- Plenary lecture, ECM3, European Congress of Mathematics, Barcelona, Jul 2000.
- Plenary lecture, International Congress of Mathematical Physics, London, Jul 2000.
- *Kähler Memorial Meeting*, Hamburg, Jan 2001.
- *M-Theory* Program, ITP, Santa Barbara, May 2001.
- *Enumerative Geometry and String Theory*, IAS/Park City Mathematics Institute, Jul 2001.
- *String Theory Workshop*, Aspen Center for Physics, Aug 2001.
- *New Fields and Strings in Subnuclear Physics*, Erice Italy, Aug 29–Sep 7, 2001.
- Workshop *Gromov-Witten Invariants and Integrable Systems*, Institute for Advanced Study, Princeton, Dec 2001 and Feb/Mar 2002.
- *Geometry. Topology and Physics*, Oxford, June 2002.
- *Strings 2002*, Cambridge, July 2002.