

Curriculum Vitae of **Dr. Michael P. Seevinck**

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Date of birth: 27 February 1977 **Nationality:** Dutch

Area of Competence: Philosophy of Physics, Philosophy of Science, Philosophy of Language, Metaphysics, History of Modern Physics.

Area of Specialisation: Philosophy of Quantum Theory, Philosophy of Science.

Research

- **Post-Doc (5/10) with Prof. Gerard 't Hooft at the Institute for Theoretical Physics, Utrecht University, the Netherlands.** August 1st 2009 – present.
- **November 2009: awarded a Veni research grant** (3-year post-doctoral scholarship from the Dutch National Science Board (NWO)).
- **Doctorate (Ph.D) obtained *Cum Laude* at Utrecht University, the Netherlands on October 27th 2008, from the Institute for History and Foundations of Science.** Dissertation completed under supervision of Dr. Jos Uffink (co-promotor) and Prof. Dr. Dennis Dieks (promotor). Title: **Parts and Wholes. An inquiry into quantum and classical correlations.** Content of thesis: novel multipartite Bell inequalities, novel aspects of entanglement in quantum physics, interpretational issues involving holism, separability and non-locality in quantum physics as well as its relationship to special relativity (questions of superluminal signalling and spacelike causation).
- **See also the list of published and submitted papers below.**
- **Visiting Researcher at the Center for Time, Philosophy Faculty, University of Sydney, Australia.** April 1st - August 1st, 2009.
- **Invited short-term visitor at the Perimeter Institute for Theoretical Physics** in Waterloo, Canada. November 18 until November 30, 2007. Conducted research in the foundations of quantum mechanics.
- **Participant of the Spring School 'Philosophy of Physics'.** March 28-April 4, 2004. Cologne, Germany. Organisers Prof. Dr. H. Lyre and Prof. Dr. P. Mittelstaedt.

University Teaching

- **Guest Lecturer for graduate course 'Philosophy of Quantum Mechanics',** HPSC4101, University of Sydney, May 2009, on the topic of 'Experimental Metaphysics'.

- **Guest Lecturer for graduate course ‘Why does nature show a mathematical structure?’** at the philosophy faculty of Radboud University Nijmegen on the topic of ‘Twentieth century physics: Einstein, mathematical naturalness and unification’. Two lectures. March 2009.
- **Lecturer in History and Foundations of Quantum Theory.** Fall Semester 2008. University of Nijmegen. Weekly lecturing in English on the history and foundations of quantum mechanics (16 lectures). Directed a weekly reading group (16 sessions). Grading homework assignments, conducted examining for this course. Assisted students in writing papers on a topic in the foundations of quantum mechanics.
- **Lecturer in Foundations of Thermodynamics and Statistical Physics.** June-July 2008. Postgraduate Course, University of Utrecht. Replacement for Dr. Uffink who was on sabbatical at the Perimeter Institute in Waterloo, Canada. Weekly lecturing in English on the foundations of thermodynamics and statistical physics (5 lectures). Conducted the examining for this course.
- **Guest Lecturer for graduate course ‘The impact of science on 20th century philosophy’** at the philosophy faculty of Radboud University Nijmegen on the topic of ‘Einstein and Quantum Mechanics’. Two lectures. March 2007.
- **Lecturer in Foundations of Quantum Theory.** Fall Semester 2004. Postgraduate Course, University of Utrecht. Replacement for Dr. Uffink who was on sabbatical at the University of Pittsburgh. Weekly lecturing in English on the foundations of quantum mechanics (16 lectures). Directed a weekly reading group (16 sessions). Grading homework assignments, conducted examining for this course. Assisted students in writing papers on a topic in the foundations of quantum mechanics.
- **Teaching Assistant for undergraduate course in Quantum Mechanics.** Spring Semester of 2004, University of Utrecht. Directed weekly problem solving sessions.
- **Teaching Assistant for graduate course in Foundations of Quantum Theory.** Fall Semester of 2002 and 2003, University of Utrecht. Directed a weekly reading group.
- **Teaching Assistant for undergraduate course in Thermal Physics.** Spring Semester of 2003, University of Utrecht. Directed weekly problem solving sessions.
- **Teaching Assistant for undergraduate course in Thermodynamics.** Fall Semester of 1999, Radboud University Nijmegen. Directed weekly problem solving sessions.

Competent to teach:

general philosophy of science, philosophy of physics, (quantum theory, relativity theory and space-time theories, statistical and thermal physics), introductory logic, topics in metaphysics.

Awards & Grants

- **Veni grant**, a 3-year post-doctoral scholarship from the Dutch National Science Board (NWO)). Awarded November 2009.

- **Visiting research scholarship** from the Center for Time, Department of Philosophy, University of Sydney for a three-month visit as a research scholar. Awarded 2008.
- **Visiting research scholarship** from the Perimeter Institute for Theoretical Physics in Waterloo, Canada. Two week research visit. Awarded 2007.
- **Scholarship** from Oriel College to study at Oxford University, UK, for two terms, i.e. January – July 2000. Scholarship paid for university and college tuition, as well as for board and lodging. Awarded 1999.

University Education

- **Graduated cum laude for the Masters in Foundations of Physics** at Utrecht University (the Netherlands), June 24th 2002. Supervisor: Dr. Jos Uffink. Graduate level courses included courses on the foundations of thermodynamics and statistical mechanics, on the foundations of space-time theories (special and general relativity), on the foundations of probability theory, on the foundations of quantum mechanics, and on general philosophy of science.
- **Graduated cum laude for the Masters in Theoretical Physics** at Radboud University Nijmegen (the Netherlands), March 28th 2002. Supervisors: Prof. Dr. Ronald Kleiss and Dr. Hans Maassen.
- **Scholarship from Oriel College to study at Oxford University**, UK. January-July 2000. Conducted research for my Masters thesis. Supervised by Dr. D. Bouwmeester of the Centre for Quantum Computation at the Clarendon Laboratory. Attended courses in the philosophy of physics. Actively involved in the philosophy of physics community at the Philosophy Faculty.
- **Courses in Philosophy at Radboud University Nijmegen**, the Netherlands. January 1997 - June 2001. Attended individual courses on metaphysics, epistemology, ethics, anthropology, history of modern philosophy, philosophy of language, philosophy of science, logic. Passed all examinations.

Further Relevant Work Experience

- **Managing editor for the journal Foundations of Physics** on behalf of Gerard 't Hooft, Chief editor. June 1st 2007 – June 1st 2008 (5/10), and August 1st 2009 – present (5/10).
- **Research Assistant at the Max-Planck Institute for Psycholinguistics** (Nijmegen) in the 'comprehension' group directed by Prof. Dr. Anne Cutler. September 2001- May 2002. Designing and performing psycholinguistic experiments. Implementing research questions into a concrete experimental environment.
- **Supervisor at Technisch Creatief Centrum Nijmegen**. Volunteer work. Supervised 14-16 year old youth conducting scientific experiments and engineering projects. January 1998 - June 1998

Administrative Duties

- **Member of board ‘Nederlandse Vereniging voor Wetenschapsfilosofie’ (NVWF).** To commence in 2009.
- **Secretary of ‘Sectie Grondslagen der Natuurkunde’, ‘Nederlandse Natuurkundige Vereniging’ (NNV).** September 2008 – present.
- **Member of the PhD student board Facultair Overleg Promovendi (FOP)** of the Faculty of Physics and Astronomy of the University of Utrecht. FOP defends the interests of PhD students within the faculty. May 2002-May 2006.
- **Secretary of the student rugby club NSRV Obelix.** July 2004-July 2005.
- **Editor of Spleijtstof.** Spleijtstof is a periodical of the Philosophy Faculty at Radboud Universiteit Nijmegen. September 2000 – June 2002.
- **Webmaster of the Institute for History and Foundations of Science,** Utrecht University. June 2002-present.

Skills

- **Languages:** Dutch, English: excellent. German, French: reasonable.
- **Computing:** Unix, Linux, OS-X, LaTeX, Mathematica.

List of Publications

- M.P. Seevinck (co-authored with M. Pawłowski, J. Kofler, T. Paterek, C. Brukner). On the need for non-local setting and outcome information so as to violate the Bell inequality. Preprint at arxiv.org/abs/0903.5042.
- M.P. Seevinck. Monogamy of Correlations vs. Monogamy of Entanglement, Submitted to *Quantum Information Processing*, July 2009. Preprint at arxiv.org/abs/0908.1867.
- F.A. Muller, M.P. Seevinck. Discerning Elementary Particles. *Philosophy of Science*, 76 (April 2009) pp. 179-200.
- O. Gühne, M.P. Seevinck. Separability criteria for genuine multiparticle entanglement. Available at arxiv.org/abs/0905.1349. Submitted to *Physical Review Letters*.
- M.P. Seevinck, Parts and Wholes. An Inquiry into Quantum and Classical Correlations, Dissertation Utrecht University, 2008. ISBN: 978-90-3934916-8. A free copy is available at arxiv.org/abs/0811.1027 or philsci-archive.pitt.edu/archive/00004338/. A hardcopy can be ordered via <http://www.igitur.nl/>.
- M.P. Seevinck, J. Uffink. Partial Separability and Entanglement Criteria for Multiqubit Quantum States. *Physical Review A*, Vol. 78, 032101 (2008). Selected for the September 2008 issue of Virtual Journal of Quantum Information. Selected for the September 15, 2008 issue of Virtual Journal of Nanoscale Science & Technology.

- J. Uffink, M.P. Seevinck. Strengthened Bell inequalities for orthogonal spin directions. *Physics Letters A*, vol. 372, 1205 (2008).
- M.P. Seevinck, J. Uffink. Local commutativity versus Bell inequality violation for entangled states and versus non-violation for separable states. *Physical Review A*, Vol. 76, 042105 (2007). Selected for the October 2007 issue of Virtual Journal of Quantum Information.
- M.P. Seevinck, J-Å. Larsson. Comment on "A local realist model for correlations of the singlet state". *The European Physical Journal B*, Vol. 58, 51-53 (2007).
- M.P. Seevinck. Classification and monogamy of three-qubit biseparable Bell correlations. *Physical Review A*. Vol. 76, 012106 (2007). Selected for the July 2007 issue of Virtual Journal of Quantum Information. Selected for the July 23, 2007 issue of Virtual Journal of Nanoscale Science & Technology.
- F.A. Muller, M.P. Seevinck. Is standard quantum mechanics technologically inadequate? *British Journal for the Philosophy of Science*, Vol 58, 595-604 (2007).
- M.P. Seevinck. Separable quantum states do not have stronger correlations than local realism. A comment on quant-ph/0611126 by Z. Chen. Available at arXiv: quant-ph/0701003 (2007).
- M.P. Seevinck. The quantum world is not built up out of correlations. *Foundations of Physics*, Vol. 36, 1573-1586 (2006).
- M.P. Seevinck. Belleterrie van EPR. (in Dutch), *Nederlands Tijdschrift Voor Natuurkunde*, Vol. 71, p. 354 (2005).
- G. Tóth, O. Gühne, M.P. Seevinck, J. Uffink. Addendum to "Sufficient conditions for three particle entanglement and their tests in recent experiments". *Physical Review A*, Vol. 72, 014101 (2005). Selected for the July 2005 issue of Virtual Journal of Quantum Information.
- M.P. Seevinck. Holism, Physical Theories and Quantum Mechanics, *Studies in the History and Philosophy of Modern Physics*, Vol. 35B, 693-712 (2004).
- M.P. Seevinck, G. Svetlichny. Bell-type Inequalities for Partial Separability in N-particle systems and Quantum Mechanical Violations, *Physical Review Letters*, Vol. 89, 060401 (2002).
- M.P. Seevinck, J. Uffink. Sufficient conditions for three particle entanglement and their tests in recent experiments, *Physical Review A*, Vol. 65, 012107 (2001).

Translations

- "The Circularity in von Neumann's Proof." Translation from German to English of 'Der Zirkel in Neumanns Beweis', section 7 from the essay of Grete Hermann 'Die Naturphilosophischen Grundlagen der Quantenmechanik'. *Abhandlungen der Fries'schen Schule* 6, 2 (1935), pp. 69-152.
- "On the causal connection of the world. An extension of classical dynamics." Translation

from German to English of ‘Über den Wirkungszusammenhang der Welt. Eine Erweiterung der klassischen Dynamik’, by H. Tetrode, *Zeitschrift für Physik*, vol. 10, 317-328 (1922).

- “The logic of non-simultaneously decidable propositions.” Translation from German to English of ‘Die Logik nicht gleichzeitig entscheidbarer Aussagen’, by Ernst Specker. *Dialectica*, vol. 14, 239-246 (1960).
- “An invariant variation principle for the motion of many electrical mass particles.” Translation from German to English of ‘Ein invarianter Variationsatz für die Bewegung mehrerer elektrischer Massenteilchen.’, by A.D. Fokker. *Zeitschrift für Physik*, vol. 58, 386 - 393 (1929).

Conference presentations

- Talk held at EPSA09, Amsterdam, the Netherlands, October 22 2009. Title: ”Discerning elementary particles”
- Talk held at workshop ESF programme ”The philosophy of science in European perspective”, Zeist, the Netherlands, October 19 2009. Title: ”Analyzing passion at a distance: progress in experimental metaphysics?”
- Talk held at the workshop Philosophical Perspectives on Understanding Quantum Mechanics at the CLEA institute, Brussels, Belgium, October 9 2009. Title: ”Analyzing passion at a distance: progress in experimental metaphysics?”
- Talk held at the Philosophy of Physics Seminar series, Centre for Time, Sydney, Australia. June 10 2009. Title: ”Analyzing passion at a distance: progress in experimental metaphysics?”
- Talk held at Center for Quantum Computer Technology, University of Queensland, Brisbane, Australia. June 4, 2009. Title: ”Analyzing passion at a distance: progress in experimental metaphysics?”
- Talk held at Centre for Quantum Dynamics, Griffith's University, Brisbane, Australia. June 3, 2009. Title: “Analyzing passion at a distance: progress in experimental metaphysics?”
- Invited talk held at Spacetime & Relativity workshop, Center for Time, Sydney, Australia. April 15, 2009. Title: ”Einstein on theory construction and unification. Lessons for current theoretical physics.”
- Invited talk held at IQOQI, Austrian Academy of Sciences, Innsbruck, Austria. February 24, 2009. Title: ”Monogamy, entanglement and deep hidden variables”
- Invited talk held at DAMTP, Cambridge University, Cambridge, UK. February 12, 2009. Title: ”Monogamy, entanglement and deep hidden variables”
- Invited talk held at the Young Researchers Conference, December 8-12, 2008. Perimeter Institute for Theoretical Physics, Waterloo, Canada. Title: ”Deep Hidden Variables”

- Two-day conference on the foundations of quantum mechanics, Brussels, October 30-31, 2008. Title: "Parts and Wholes. On some results from my dissertation"
- One-day conference on the foundations of quantum mechanics, Utrecht, October 28, 2008. Title: "Deep Hidden Variables"
- Causality and Locality in Physics, Tilburg, June 13, 2008. Title: "What is beneath the surface? On deeper level hidden-variables and comparing surface and subsurface levels"
- Models and Simulation 2, Tilburg, October 11-13, 2007. Title: "On the merits of modeling quantum mechanics via semi-classical models"
- 15th UK and European Meeting on the Foundations of Physics, Leeds, March 28-31, 2007. Title: "Deriving standard Bell inequalities from non-locality and its repercussions for the (im)possibility of doing experimental metaphysics"
- European One-day Conference in the Philosophy and Foundations of Physics, Utrecht, May 24, 2006. Title: "Stunningly Stronger Bell inequalities"
- 33rd annual Philosophy of Science Conference, Dubrovnik, April 10-14, 2006. Title: "Simulating Local Realism by Quantum Mechanics"
- Philosophical and Foundational Issues in Quantum Theory, Budapest, September 1-5, 2005. Title: "The Quantum world is not build up out of correlations (although the quantum state is)"
- 13th UK Meeting on the Foundations of Physics, York, September 20-24, 2004. Title: "Historical and Conceptual Aspects of von Neumann's No Hidden Variables Argument"
- 12th UK Meeting on the Foundations of Physics, Leeds, September 9-12, 2003. "A Criterion for Holism in Quantum Mechanics"
- 12th International Congress of Logic, Methodology and Philosophy of Science. Oviedo, August 7-13, 2003. Title: "Quantum Operations and Measurement"
- ESF Workshop on Holism in Physics (invited speaker), Bonn, July 4-5, 2003. Title: "A Criterion for Holism in Quantum Mechanics"
- 11th UK Meeting on the Foundations of Physics, Oxford, September 10-14, 2002. Title: "Multi-partite Entanglement versus Multi-partite Non-locality"

Poster presentations

- Vienna Symposium on the Foundations of Modern Physics. June 7-10, 2007. Title: "Local commutativity versus Bell inequality violation for entangled states and versus non-violation for separable states".
- Departmental Day, Utrecht University. June 12, 2008. Title: "What is non-classical about quantum entanglement ?".

Reviewer for academic journals:

British Journal for the Philosophy of Science
Physical Review Letters
Studies in the History and Philosophy of Modern Physics
International Studies in the Philosophy of Science
Foundations of Physics
Physical Review A
Physical Review B
Journal of Physics A
Foundations of Science
Journal for General Philosophy of Science
Annals of Physics
Physics Letters A
Mathematical Reviews
Quantum Information and Computation
Modern Physics Letters A
New Journal of Physics

Memberships:

American Physical Society
Nederlandse Natuurkundige Vereniging
Nederlandse Vereniging voor Wetenschapsfilosofie