

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

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**Date of birth:** 27 February 1977

**Nationality:** Dutch

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**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

- **June 2010 - present: Post-doc at Radboud University Nijmegen on NWO Veni grant.** Joint position with the Faculty of Science (5/10) and the Faculty of Philosophy (5/10).
- **November 2009: awarded a Veni research grant** (3-year post-doctoral scholarship from the Dutch National Science Board (NWO)).
- **Post-Doc (5/10) with Prof. Gerard 't Hooft at the Institute for Theoretical Physics, Utrecht University, the Netherlands.** August 1<sup>st</sup> 2009 – March 1<sup>st</sup> 2010.
- **Doctorate (Ph.D) obtained *cum laude* at Utrecht University, the Netherlands on October 27<sup>th</sup> 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.**
- **See also the list of published and submitted papers below.**
- **Visiting Researcher at the Center for Time, Philosophy Faculty, University of Sydney, Australia.** April 1<sup>st</sup> - August 1<sup>st</sup>, 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

- **Masters course Philosophy for Physicists,** Dept. of Philosophy, Faculty of Science, Radboud University Nijmegen, Spring 2012.

- **Third year bachelor course History and Foundations of Modern Mathematics and Physics** Dept. of Philosophy, Faculty of Science, Radboud University Nijmegen, Spring 2012.
- **Third year bachelor course on Whitehead's 'Process and Reality'**, Faculty of Philosophy, Radboud University Nijmegen, Fall 2011.
- **Supervision of PhD and master students at philosophy faculty Radboud University Nijmegen. 2010 - present**
- **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'. Three lectures. May 2011, March 2010 and 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. Weekly lecturing in English on the foundations of thermodynamics and statistical physics. Conducted the examining for this course.
- **Guest Lecturer for graduate course 'The impact of science on 20<sup>th</sup> 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. 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

- **Visiting Research Fellowship** from the Sydney Center for the Foundations of Science, University of Sydney for the 2<sup>nd</sup> semester of 2011. Awarded 2010.
- **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 24<sup>th</sup> 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 28<sup>th</sup> 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.

Phd Committee:  
2011 Christian de Ronde, Utrecht.

## Further Relevant Work Experience

- **Managing editor for the journal Foundations of Physics** on behalf of Gerard 't Hooft, Chief editor. June 1<sup>st</sup> 2007 – June 1<sup>st</sup> 2008 (5/10), and August 1<sup>st</sup> 2009 – March 1<sup>st</sup> 2010.
- **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)**. January 2010 - present.
- **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 Spleijststof**. Spleijststof 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, Maple, Matlab, Mathematica.

## List of Publications

- M.P. Seevinck (co-authored with F. Hasselman, R.F.A. Cox). Caught in the undertow: There is structure beneath the ontic stream. Submitted. 2010.

- M.P. Seevinck, No-signaling, perfect bipartite dichotomic correlations and local randomness. Published in 'Advances in Quantum Theory' (Växjö, Sweden, 14-17 June 2010); AIP Conference Proceedings, vol. 1327; Melville, New York, 2011.
- M.P. Seevinck, Can quantum theory and special relativity peacefully coexist? Invited white paper for Quantum Physics and the Nature of Reality, John Polkinghorne 80th Birthday Conference. St Annes College, Oxford. 26 - 29 September 2010. Preprint at [arxiv.org/abs/1010.3714](http://arxiv.org/abs/1010.3714).
- M.P. Seevinck, J. Uffink. Not throwing out the baby with the bathwater: Bell's condition of local causality mathematically 'sharp and clean'. Published in *Explanation, prediction and Confirmation*, Eds. D. Dieks, W.J. Gonzalez, S. Hartmann, Th. Uebel, M. Weber. Springer Publishing, Dordrecht, the Netherlands. 2011.
- M.P. Seevinck (co-authored with M. Pawłowski, J. Kofler, T. Paterek, C. Brukner). Non-local setting and outcome information for violation of Bell's inequality. *New Journal of Physics*, Vol. 12, 083051 (2010).
- M.P. Seevinck. Monogamy of Correlations vs. Monogamy of Entanglement, *Quantum Information Processing*, vol. 9, pp. 273-294 (2010).
- O. Gühne, M.P. Seevinck. Separability criteria for genuine multiparticle entanglement. *New Journal of Physics*, Vol. 12, 053002 (2010).
- F.A. Muller, M.P. Seevinck. Discerning Elementary Particles. *Philosophy of Science*, 76 (April 2009) pp. 179-200.
- 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](http://arxiv.org/abs/0811.1027) or [philsci-archive.pitt.edu/archive/00004338/](http://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. Belleterie 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). Available at: <http://arxiv.org/abs/1103.4537>
- "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).

## Organized

- Monthly colloquium series at Center for the History of Philosophy and Science, Radboud University Nijmegen, 2010 - present
- One-day conference on my PhD defense, Oktober 2008.
- European Goodbye Conference to Jos Uffink, July 15<sup>th</sup> 2011.

## Conference presentations

- “Challenging the gospel: Grete Hermann on von Neumann’s no-hidden-variables proof”. Talk (invited) held at CHPSTM Workshop ‘Grete Hermann: between physics and philosophy’, University of Aberdeen, Aberdeen, Scotland. 5-6 May 2012.
- “Quantum theorem shakes foundations? On the Pusey-Barrett-Rudolph result.” Talks held at Cambridge (UK), Utrecht and Nijmegen (Netherlands). November-December 2011.
- “From Bell's to Uffink's inequality and beyond.” Talk held at European Goodbye Conference to Jos Uffink, Friday 15 July 2011, Utrecht, The Netherlands.
- “Analyzing passion at a distance: non-local information needed for Bell inequality violation”, talk (invited) held at symposium on "Decoherence and No-Signalling: Current Interpretational Problems of Quantum Theory" Bern (Switzerland), June 2011; and at Radboud University Nijmegen, dept. of Mathematical Physics, July 2011.
- “Einstein on 'Why Philosophy is Needed for Theory Construction'”. Talk held at Center for the History of Philosophy and Science, Faculty of Philosophy, Radboud University Nijmegen, 10th December 2010 and at the Crash Test Club on February 18th 2011.
- “Structuralism in Physics”. Talk (invited) held at Faculty of Philosophy, University of Groningen, December 8th, 2010.
- Talk (invited) held at QUIT, Dipartimento di Fisica “A. Volta”, Pavia, Italy, 14<sup>th</sup> September 2010. Title: ”Monogamy, entanglement and deep hidden variables”
- Talk held at conference 16th U.K. and European Meeting on the Foundations of Physics, Aberdeen, Scotland, 6-9 July 2010. Title: “Analyzing passion at a distance: progress in experimental metaphysics?”
- Talk (invited) held at conference Advances in Quantum Theory, Växjö, Sweden, June, 2010. Title: “Monogamy of non-local correlations”
- Talk (invited) held at Fysica 2010, Utrecht, the Netherlands, April 2010. Title: “On the happy marriage of quantum foundations and information theory (or why physics needs quantum foundations)”

- Talk (invited) held at Workshop Part and Whole in Physics, Leiden, the Netherlands, March 2010. Title: "Composite systems and their representation in quantum and classical physics"
- Talk held at EPSA09, Amsterdam, the Netherlands, October 22, 2009. Title: "Discerning elementary particles"
- Talk (invited) 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"
- 15<sup>th</sup> 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)”
- 13<sup>th</sup> 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”
- 12<sup>th</sup> UK Meeting on the Foundations of Physics, Leeds, September 9-12, 2003. ”A Criterion for Holism in Quantum Mechanics”
- 12<sup>th</sup> 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”
- 11<sup>th</sup> 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  
Erkenntnis  
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  
European Journal for the Philosophy of Science  
New Journal of Physics

**Memberships:**

American Physical Society  
Nederlandse Natuurkundige Vereniging  
Nederlandse Vereniging voor Wetenschapsfilosofie