

# CURRICULUM VITÆ

## HANS HALVORSON

Department of Philosophy  
Princeton University  
Princeton, NJ 08544  
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### Permanent positions

2010– Professor, Princeton  
2005–10 Associate Professor with Tenure, Princeton  
2001–05 Assistant Professor, Princeton

### Temporary positions

2008–09 Visiting Researcher, Mathematical Institute, Utrecht (group of Ieke Moerdijk)  
2006 Visiting Fellow, Perimeter Institute for Theoretical Physics

### Education

2001 PhD, Philosophy, Pittsburgh  
1998 MA, Mathematics, Pittsburgh  
1997 MA, Philosophy, Pittsburgh  
1995 BA (honors), Philosophy, Calvin College

### Research focus

Category Theory (especially Categorical Logic), Philosophy of Physics

### Areas of special competence

Philosophical Logic, Philosophy of Mathematics, Philosophy of Religion, Philosophy of Science

### Work in progress (selected)

HH, “Essay review of *Interpreting Quantum Theories*,” for *Metascience*.

HH and Klaas Landsman, “Multiply connected spaces and identical particles.”

HH, “Does quantum mechanics kill time?”

David Baker and HH, “How is spontaneous symmetry breaking possible?”

HH and Noel Swanson, “Natural structure on state space”

HH and Jim Weatherall, “What is a scientific theory?”

## Published articles

- HH. “What scientific theories could not be,” forthcoming in *Philosophy of Science*.
- HH and Helge Kragh. “Theism and physical cosmology,” forthcoming in *The Routledge Companion to Theism*, edited by C. Taliaferro. Routledge 2012.
- HH and Helge Kragh. “Cosmology and theology,” *Stanford Encyclopedia of Philosophy*, Winter 2011 Edition. <http://plato.stanford.edu/entries/cosmology-theology/>
- HH. “The measure of all things: quantum mechanics and the soul.” In *The soul hypothesis: investigations into the existence of the soul* edited by M. Baker and S. Goetz, pp. 138–163. Continuum Press 2010.
- Dave Baker and HH. “Antimatter.” *The British Journal for the Philosophy of Science* 61:93–121, 2010.
- HH and Adam Neder. “Quantum Envy: Review of *Quantum Physics and Theology* by John Polkinghorne,” *Lutheran Forum* 55–57, 2007.
- HH. “Comments on Clouser’s claims for Theistic science,” *Perspectives on Science and Christian Faith* 58:18–19, 2006.
- HH and M. Müger. “Algebraic quantum field theory,” in *Handbook of the Philosophy of Physics*, ed. J. Butterfield and J. Earman. Kluwer 2006, pp. 731–922
- HH. “Quantum mechanics,” in *The Philosophy Of Science: An Encyclopedia*, ed. J. Pfeifer and S. Sarkar. Routledge 2006
- HH. “Locality,” in *The Philosophy Of Science: An Encyclopedia*, ed. J. Pfeifer and S. Sarkar. Routledge 2006
- Jeffrey Bub and HH. “Can quantum cryptography imply quantum mechanics? Reply to Smolin,” *Quantum Information and Computation* 5:170–175, 2005.
- HH. “Remote preparation of arbitrary ensembles and quantum bit commitment,” *Journal of Mathematical Physics* 45, 4920–4931 (2004)
- HH. “On information-theoretic characterizations of physical theories,” *Studies in History and Philosophy of Modern Physics* 35, 277–293 (2004)
- HH. “Complementarity of representations in quantum mechanics,” *Studies in History and Philosophy of Modern Physics* 35, 45–56 (2004)
- Rob Clifton, Jeffrey Bub and HH. “Characterizing quantum theory in terms of information-theoretic constraints,” *Foundations of Physics* 33, 1561–1591 (2003)
- HH and Rob Clifton. “Reconsidering Bohr’s reply to EPR,” in *Non-locality and Modality*, ed. T. Placek and J. Butterfield. Kluwer (2002), pp. 3–18

- HH. “Review of *On quanta, mind, and matter* by Harald Atmanspacher,” *Studies in History and Philosophy of Modern Physics* 33, 744–747 (2002)
- HH and Rob Clifton. “No place for particles in relativistic quantum theories?” *Philosophy of Science* 69, 1–28 (2002)
- Also appears in *The Philosopher’s Annual XXV* (2002).
  - Also appears in *Ontological Aspects of Quantum Field Theory*, M. Kuhlmann et al., eds. World Scientific (2002), pp. 181–213
- Rob Clifton and HH. “Are Rindler quanta real? Inequivalent particle concepts in quantum field theory,” *British Journal for the Philosophy of Science* 52, 417–470 (2001)
- HH. “Review of *A philosopher’s understanding of quantum mechanics* by Pieter Vermaas,” *British Journal for the Philosophy of Science* 52, 387–391 (2001)
- HH. “On the nature of continuous physical quantities in classical and quantum mechanics,” *Journal of Philosophical Logic* 30, 27–50 (2001)
- Also appears in *The Philosopher’s Annual XXIV*, 41–65 (2001)
- HH. “Reeh-Schlieder defeats Newton-Wigner. On alternative localization schemes in relativistic quantum field theory,” *Philosophy of Science* 68, 111–133 (2001)
- *Philosophy of Science* best paper by a recent PhD, 2001
- Rob Clifton and HH. “Entanglement and open systems in algebraic quantum field theory,” *Studies in History and Philosophy of Modern Physics* 32, 1–31 (2001)
- HH. “The Einstein-Podolsky-Rosen state maximally violates Bell’s inequalities” *Letters in Mathematical Physics* 53, 321–329 (2000)
- HH and Rob Clifton. “Generic Bell correlation between arbitrary local algebras in quantum field theory,” *Journal of Mathematical Physics* 41, 1711–1717 (2000)
- Rob Clifton, HH and Adrian Kent. “Non-local correlations are generic in infinite-dimensional bipartite systems,” *Physical Review A* 61, 042101 (2000)
- Rob Clifton and HH. “Bipartite mixed states of infinite-dimensional systems are generically nonseparable,” *Physical Review A* 61, 012108 (2000)
- Rob Clifton and HH. “Maximal beable subalgebras of quantum mechanical observables,” *International Journal of Theoretical Physics* 38, 2441–2484 (1999)
- Rob Clifton, David Feldman, HH, Michael Redhead, and Alex Wilce. “Superentangled states,” *Physical Review A* 58, 135–145 (1998)

## Edited books

HH, ed. *Deep beauty: understanding the quantum world through mathematical innovation*. Cambridge 2011

Jeremy Butterfield and HH, eds. *Quantum entanglements: selected papers of Rob Clifton*. Oxford 2004

## Dissertation

*Locality, localization, and the particle concept: topics in the foundations of quantum field theory*. Pittsburgh 2001. Advisor: Rob Clifton

## Upcoming talks

“Divine action in a quantum world” *Philosophy of Science, Faith, and Science*. Calvin College. Apr 2012.

Mini-course “Philosophy of Mind meets Quantum Mechanics” (with Jeff Schwartz). St. Thomas Summer Seminar in Philosophy of Religion. June 2012.

“What is a scientific theory?” *Philosophy of Science Association Meeting*, San Diego. Nov 2012.

## Past talks

“What scientific theories could not be.” University of Washington, Philosophy Colloquium. Nov 2011.

“Does physical cosmology confirm theistic belief?” McIntyre Lecture on the Foundations of Physics. Wheaton College. Nov 2011.

“Foundations for categories, by categories.” Conference: *Foundational Questions in the Mathematical Sciences*. Traunkirchen, Austria. July 2011.

“Natural structure on state space.” UC Irvine, Philosophy of Physics Workshop. Apr 2011

“What scientific theories could not be.” UC Irvine, LPS Colloquium. Feb 2011

“Naturalism in the interpretation of quantum mechanics” Philosophy Colloquium, Beijing University. Jun 2010

“Recent results on duality for the category of first-order theories” Mathematical Logic Seminar, University of Nijmegen. Feb 2009

“Notions of monoidal category” Operads Seminar, University of Utrecht. Jan 2009

“Antimatter and the metaphysics of opposites” Philosophy Colloquium, University of Texas at Austin, Nov 2007

“Representing non-local boxes with  $C^*$ -algebras” Perimeter Institute for Theoretical Physics, May 2006

- “On the conventionality of the claim, ‘There are para-particles’” Minnesota Center for the Philosophy of Science, Apr 2006
- “Otherworldly information theory” Boston Colloquium for Philosophy of Science, Mar 2006
- “Deriving quantum mechanics from information-theoretic axioms” Conference in honor of John Wheeler, Princeton. Feb 2006
- “No reductive physicalism, no measurement problem” Conference: *New Directions in the Foundations of Physics*, University of Maryland. Apr 2005
- “No reductive physicalism, no measurement problem” Philosophy Colloquium, University of Southern California. Jan 2005
- “No reductive physicalism, no measurement problem” Philosophy Colloquium, University of Notre Dame. Sep 2004
- “Algebraic quantum field theory” Center for Philosophy of Science, University of Pittsburgh. Oct 2004
- “A generalized no-bit-commitment theorem for quantum systems” Conference: *C\*-Algebras and Quantum Information Theory*. UC Santa Barbara. Jun 2004
- “Information-theoretic axioms for quantum mechanics” Conference: *Contemporary Issues in Philosophy of Physics*. University of Western Ontario. May 2004
- “Can quantum cryptography imply quantum mechanics?” Foundations of Physics Colloquium, University of Maryland. Nov 2003.
- “Can the quantum eraser erase the past?” Faculty Seminar on the Concept of Time, Princeton Council of the Humanities. Nov 2003.
- “Characterizing quantum theory in terms of information-theoretic constraints” Philosophy of Physics Workshop, Oxford University. Mar 2003.
- “Bohr versus Bohm on ontological pluralism” Philosophy of Science Association Biennial Meeting. Nov 2002.
- “Complementarity in quantum field theory” Boston Colloquium for Philosophy of Science. Oct 2002.
- “Objective indeterminacy: A prolegomenon to Niels Bohr’s philosophy of quantum theory” Princeton Philosophical Society. May 2002.
- “Non-existent quantities in quantum theory” Conference: *New Directions in the Foundations of Physics*. University of Maryland. May 2002.
- “Complementarity of representations in quantum mechanics.” Conference: *Philosophy of Mathematics in Application*. UC Irvine. Mar 2002.
- “Reconsidering Bohr’s reply to EPR.” Conference: *Modality, Probability, and Bell’s Theorem*. Jagiellonian University, Poland. Aug 2001.

“Complementarity of representations in quantum mechanics.” International Quantum Structures Association Biennial Meeting. Cesena Mar 2001.

“Does relativity imply nonlocality? Unpacking the Reeh-Schlieder theorem.” Logic & Philosophy of Science Dept, UC Irvine, May 2000.

### **Additional languages**

Dutch: excellent reading and good speaking (B2 certificate)

French: good reading

German: excellent reading and good speaking (C1 certificate)

Ancient Greek: basic reading

### **Fellowships and awards**

NSF Grant #1127260: Identical Particles and Statistics in Superselection Theory, 2011–12

Associate Fellow, Pittsburgh Center for the Philosophy of Science 2002–present

Princeton University, W. H. Tuck '12 Memorial Fund grant for international research collaboration, 2010–11.

Mellon New Directions in the Humanities Fellowship 2008–09

(Proposal: Topos theory – the language of science)

Behrman Fellow, Princeton Council of the Humanities 2005–08

Princeton University 250th Anniversary Fund for Innovation in Undergraduate Education, grant for developing the formal logic curriculum

James Cushing Memorial Prize in the History and Philosophy of Physics 2004

Article named among “Ten best articles in philosophy for the year 2002”

*The Philosopher's Annual*

Article named “Best by a recent PhD for the year 2001,” Philosophy of Science Association

Article named among “Ten best articles in philosophy for the year 2001”

*The Philosopher's Annual*

Alan Ross Anderson Fellowship for Philosophical Logic 1997

Pew Younger Scholars Graduate Fellow 1995–98

### **Teaching and advising**

Graduate advising: Princeton’s PhD program in philosophy does not have dissertation committees, but I have worked closely with, and/or have written letters for, the following graduate students. I was a co-advisor for students marked with an asterisk, and primary advisor for students marked with two asterisks.

- Noel Swanson\*\*: in progress
- Jim Weatherall (UC Irvine): in progress
- Sander Wolters (Utrecht/Nijmegen): in progress
- Josh Hershey\*: in progress
- Joe Rachiele\*\*: in progress
- Johanna Wolff (Stanford): in progress
- Caleb Cohoe: tenure-track at Metropolitan State University
- Jada Strabbing: tenure-track at Fordham University

- Giovanni Valente\* (Maryland): tenure-track at Pittsburgh
- Yuichiro Kitajima (Hokkaido): tenure-track at Nihon University
- Dave Baker\*\*\*: tenure-track at Michigan
- Lara Buchak: tenure-track at UC Berkeley
- Tracy Luper\* (Texas): tenure-track at James Madison University
- Antony Eagle: tenure-track at Oxford

#### Graduate seminars taught

- Philosophy of mathematics: sets theory and category theory (with John Burgess)
- Categorical logic: topos theory
- Quantum information theory and the foundations of quantum mechanics (with Bas van Fraassen)
- Metaphysics of physics (with Jeremy Butterfield)
- Foundations of quantum field theory
- Scientific realism and antirealism
- From physics to metaphysics (with Adam Elga)
- Faculty advisor for the graduate reading group in philosophy of religion (2007–2010)

Princeton has no required graduate seminars, and students do not receive credit for attending seminars. Instead, they receive credit for independent work called “units.” I have directed work that led to units in general philosophy of science, philosophy of physics, philosophy of religion, and philosophical logic.

Senior theses advised: Between 2001 and now (besides two years on research leave), I have advised between one and five senior theses per year. I have advised theses not only for the philosophy department, but also for the mathematics and physics departments. Besides advising theses in my main areas of research and teaching, I have also advised theses in: metaphysics, philosophy of mind, philosophy of biology and medicine, Kierkegaard, and American pragmatism.

#### Upper level undergraduate courses and seminars

- Advanced Logic: Model Theory
- Category Theory
- Philosophical Logic
- Philosophy of Physics
- Philosophy of Religion

#### Undergraduate survey courses

- Introduction to Formal Logic
- History of Modern Philosophy

#### **Community service, departmental committees, and outside memberships**

Princeton University Research Board 2007–11

PhD Placement Chair, Princeton Philosophy Dept 2009–12

Colloquium Chair, Princeton Philosophy Dept 2010–11

Director of Graduate Studies, Princeton Philosophy Dept 2007–08

PhilPapers.org Area Editor, Philosophy of Physical Science 2011–

Co-organizer (with Steve Awodey) of Symposium on Categorical Perspectives in the Philosophy of Physics, Philosophy of Science Association Meeting, Nov 2010  
 Academic-Athletic Fellow, Princeton University Rowing 2011–  
 Co-taught Philosophy of Religion Seminar with Kelly James Clark, Peking University 2010  
 External dissertation examiner: University of Texas Philosophy Dept 2007, Universiteit Utrecht Foundations of Science Dept 2009  
 External reviewer for faculty tenure and full professor promotions: Boston University, UChicago, Georgetown, Michigan, NYU, Stanford, University of Waterloo, Yale  
 Organizer of conference: *Deep beauty: understanding quantum mechanics through mathematical innovation* Princeton, NJ. Oct 2007  
 Board of Academic Advisors, The John Templeton Foundation 2006–09, 2011–13  
 Program Committee, Philosophy of Science Association Meeting 2006  
 Co-organizer of Oxford-Princeton partnership in Philosophy of Physics, annual workshop, and student exchange 2001–  
 Invited participant in Princeton Council of the Humanities, philosophy of time group, 2003–04  
 Invited participant in New York Institute of Philosophy, cosmology and religion group, fall 2008  
 Referee for:

- *Annals of Pure and Applied Logic*
- *Australasian Journal of Philosophy*
- *British Journal for the Philosophy of Science*
- *Canadian Journal of Philosophy*
- *Christian Scholars Review*
- *Communications in Mathematical Physics*
- *Erkenntnis*
- *Foundations of Physics*
- *International Studies in the Philosophy of Science*
- *Journal of Mathematical Physics*
- *Journal of Physics A*
- *Notre Dame Journal of Formal Logic*
- *Philosopher's Imprint*
- *Philosophy of Science*
- *Physics Letters A*
- *Physical Review A*
- *Physical Review Letters*
- *Reviews of Mathematical Physics*
- *Studies in History and Philosophy of Modern Physics*
- *Theoria*
- Quantum Physics and Logic (QPL 2011)
- L'Agence nationale de la recherche (France)
- Fonds zur Förderung der wissenschaftlichen Forschung (Austria)
- Elsevier Scientific Publishers
- Hackett Publishing
- John Templeton Foundation
- Oxford University Press
- Oneworld Publications



- Princeton University Press
- Springer Verlag
- National Science Foundation (USA)
- Israel Science Foundation
- Social Sciences and Humanities Research Council of Canada

Reviewer for AMS Mathematics Reviews

Committees and special duties, Princeton Philosophy Department

Graduate language examiner (French, German) 2001–present

Computer committee chair 2004–06

Curriculum committee 2001–03, 2004–06, 2007–08

Graduate admissions committee 2001–02, 2003–06, 2007–08, 2009–11

Library committee 2009–10

Princeton Society of Fellows in the Humanities selection committee 2001–02

## References

Frank Arntzenius: frank.arntzenius@philosophy.ox.ac.uk

Jeffrey Bub: jbub@carnap.umd.edu

Jeremy Butterfield: jb56@cus.cam.ac.uk

John Earman: jearman@pitt.edu

Adrian Heathcote: adrian.heathcote@arts.usyd.edu.au

Klaas Landsman: landsman@math.ru.nl

David Malament: dmalamen@uci.edu

Laura Ruetsche: ruetsche@umich.edu

Stephen Summers: sjs@math.ufl.edu

Bas van Fraassen: fraassen@sfsu.edu

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