

SCIENTIFIC REALISM

Time and Place: Tuesdays 16:15-17:45, 23.21/U1.83

Instructor: Dr. Ioannis Votsis

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Office hours (Room Geb. 23.21/04.86): Wednesdays 11:00-12:00

What kind of knowledge, if any, science reveals of the physical world? This question has preoccupied the minds of many eminent thinkers. Answers to it are typically classified as either realist or anti-realist. The aim of the course is to probe some of the most important of these answers. We will be examining a number of positions, e.g. logical positivism, constructive empiricism, entity realism, structural realism, and social constructivism. Among other things, we will be asking: What is the relation between observation and theory? Is the distinction between observables and unobservables warranted? Do we have reason to be selective realists? What is the role of explanation in scientific inferences? Are there always empirically equivalent rivals to any given theory? Does anything survive scientific revolutions? What is the import of history and sociology in the philosophy of science?

Main Textbook

Curd, M. and Cover, J.A. (eds.) (1998) *Philosophy of Science: The Central Issues*, New York: W.V. Norton & Company.

General Surveys:

- Boyd, R. (2002) 'Scientific Realism', *The Stanford Encyclopedia of Philosophy*, Edward N. Zalta (ed.), <http://www.seop.leeds.ac.uk/entries/scientific-realism/>
- Psillos, S. (2000) 'The Present State of the Scientific Realism Debate', *British Journal for the Philosophy of Science*, vol. 51 (Supp): 705-728.
- Votsis, I. (unpublished) 'The Scientific Realism Debate', LSE, ch.1 of PhD Thesis, <http://www.votsis.org/papers.htm>

Coursework:

- One presentation (about 20 minutes) on one of the essential readings. [3 credits]
- One essay (about 2,500 words), **deadline 31/01/07**. [3 credits]

NB: Presentations will be assigned on the first week. Suggested essay topics will be distributed in December.

WEEK 1: Introduction and Presentation Assignments

WEEK 2: Logical Positivism

Essential Reading:

Ayer, A.J. (1988) 'In Defence of Empiricism' in A. Phillips Griffiths, *A.J. Ayer: Memorial Essays*, Cambridge: Cambridge University Press, 1991.

Further Reading:

- Carnap, R., (1928) *Der Logische Aufbau der Welt*, Berlin: : Schlachtensee Weltkreis-Verlag.
- Friedman, M. (1991) 'The Re-Evaluation of Logical Positivism', *The Journal of Philosophy*, vol. 88: 505-19.

Griffiths, A.P. (1991) *A.J. Ayer: Memorial Essays*, Cambridge: CUP.

WEEK 3: Scientific Revolutions

Essential Reading:

Kuhn, T. (1962) 'The Nature and Necessity of Scientific Revolutions', reprinted in Curd, M. and Cover, J.A. (eds.) *Philosophy of Science: The Central Issues*, New York: W.V. Norton & Company, 1998, pp. 86-101.

Further Reading:

Bird, A. (2001) *Thomas Kuhn*, Chesham: Acumen.

Lakatos, I. (1970) 'Falsificationism and the Methodology of Scientific Research Programmes', in I. Lakatos and A.E. Musgrave (eds.) *Criticism and the Growth of Knowledge*, Cambridge: Cambridge University Press.

Shapere, D. (1964) Book Review: *The Structure of Scientific Revolutions*, *Philosophical Review*, vol. 73: 383-394.

WEEK 4: Inference to the Best Explanation

Essential Reading:

Lipton, P. (1991) *Inference to the Best Explanation*, London: Routledge, ch.4.

Further Reading:

Harman, G.H. (1965) 'The inference to the best explanation', *Philosophical Review* 74 (1): 88-95.

Psillos, S. (1996) 'On Van Fraassen's Critique of Abductive Reasoning', *The Philosophical Quarterly*, vol. 46, no. 182: 31-47.

Ladyman, J. et al. (1997) 'A Defence of Van Fraassen's Critique of Abductive Inference: Reply to Psillos', *The Philosophical Quarterly*, vol. 47, no. 188: 305-321.

WEEK 5: Pessimistic Meta-Induction

Essential Reading:

Laudan, L. (1981) 'A Confutation of Convergent Realism', *Philosophy of Science*, vol. 48(1): 19-49.

Further Reading:

Lyons, T.D. (2002) 'Scientific Realism and the Pessimistic Meta-Modus Tollens', in S. Clarke and T.D. Lyons (eds.) *Recent Themes in the Philosophy of Science*, Dordrecht: Kluwer Academic Publishers.

Putnam, H. (1978) *Meaning and the Moral Sciences*, London: Routledge and Kegan Paul.

Laudan, L. (1977) *Progress and its Problems: Toward a Theory of Scientific Growth*, Berkeley: University of California Press.

WEEK 6: Convergent Realism Revisited

Essential Reading:

Hardin, C.L. and Rosenberg, A. (1982) 'In Defence of Convergent Realism', *Philosophy of Science*, vol. 49: 604-615.

Further Reading:

Kitcher, P. (1993) *The Advancement of Science*, Oxford: OUP.

- Psillos, S. (1996) 'Scientific Realism and the Pessimistic Induction', *PSA* 1996, vol. 3: S306-S314.
- Worrall, J. (1994) 'How to Remain (Reasonably) Optimistic: Scientific Realism and the "Luminiferous Ether"', in D. Hull, M. Forbes and R.M. Burian (eds.) *PSA 1994*, vol. 1, East Lansing, MI: Philosophy of Science Association, pp. 334-342.

WEEK 7: Observation and Theory

Essential Reading:

Maxwell, G. (1962) 'The Ontological Status of Theoretical Entities', reprinted in Curd, M. and Cover, J.A. (eds.) *Philosophy of Science: The Central Issues*, New York: W.V. Norton & Company, 1998, pp. 1052-1063.

Further Reading:

- Fodor, J. (1984) 'Observation Reconsidered', *Philosophy of Science*, vol. 51(1):23-43.
- Hanson, N.R. (1958) *Patterns of Discovery*, Cambridge: Cambridge University Press.
- Kosso, P. (1992) *Reading the Book of Nature*, Cambridge: Cambridge University Press.

WEEK 8: Constructive Empiricism I

Essential Reading:

Van Fraassen, B. C. (1980) 'Arguments Concerning Scientific Realism', reprinted in Curd, M. and Cover, J.A. (eds.) *Philosophy of Science: The Central Issues*, New York: W.V. Norton & Company, 1998, pp. 1070-1075.

Further Reading:

- Brown, J.R. (1994) 'Explaining the Success of Science', in *Smoke and Mirrors: How Science Reflects Reality*, London: Routledge, ch. 1.
- Churchland, P.M. and Hooker, C.A. (eds.) (1985) *Images of Science*, Chicago: University of Chicago Press.
- Rosen, G. (1994) 'What is constructive empiricism?', *Philosophical Studies*, vol. 74: 143-78.

WEEK 9: Constructive Empiricism II

Essential Reading:

Musgrave, A. (1985) 'Realism vs. Constructive Empiricism', reprinted in Curd, M. and Cover, J.A. (eds.) *Philosophy of Science: The Central Issues*, New York: W.V. Norton & Company, 1998, pp. 1088-1113.

Further Reading:

- Churchland, P.M. (1982) 'The Anti-Realist Epistemology of van Fraassen's "The Scientific Image"', *Pacific Philosophical Quarterly*, vol. 63: 226-235.
- Psillos, S. (1999) 'Constructive Empiricism Scrutinised' in *Scientific Realism: How Science Tracks Truth*, London: Routledge, ch. 9.
- Worrall, J. (1984) 'An Unreal Image', *British Journal for the Philosophy of Science*, vol. 35: 65-80.

WEEK 10: Underdetermination of Theories by Evidence

Essential Reading:

Laudan, L. and Leplin, J. (1991) 'Empirical Equivalence and Underdetermination', *Journal of Philosophy*, vol. 88: 449–72.

Further Reading:

Kukla, A. (1993) 'Laudan, Leplin, Empirical Equivalence and Underdetermination', *Analysis* 53: 1-7.

Laudan, L. and Leplin, J. (1993) 'Determination Underdetermined: Reply to Kukla', *Analysis* 53: 8-16.

Okasha, S. (1997) 'Laudan and Leplin on Empirical Equivalence', *British Journal for the Philosophy of Science*, vol. 48(2): 251-256.

WEEK 11: Entity Realism I

Essential Reading:

Hacking, I. (1982) 'Experimentation and Scientific Realism', reprinted in Curd, M. and Cover, J.A. (eds.) *Philosophy of Science: The Central Issues*, New York: W.V. Norton & Company, 1998, pp. 1153-68.

Further Reading:

Cartwright, N. (1980) 'Do the Laws of Physics State the Facts?', reprinted in Curd, M. and Cover, J.A. (eds.) *Philosophy of Science: The Central Issues*, New York: W.V. Norton & Company, 1998, pp. 865-77.

Cartwright, N. (1983) *How the Laws of Physics Lie*, Oxford: Clarendon Press.

Hacking, I. (1983) *Representing and Intervening*, Cambridge: Cambridge University Press.

WEEK 12: Entity Realism II

Essential Reading:

Resnik, D. B. (1994) 'Hacking's Experimental Realism', reprinted in Curd, M. and Cover, J.A. (eds.) *Philosophy of Science: The Central Issues*, New York: W.V. Norton & Company, 1998, pp. 1153-68.

Further Reading:

Chakravartty, A. (1998) 'Semirealism', *Studies in History and Philosophy of Science*, vol. 29A(3): 391-408.

Galison, P. (1987) *How Experiments End*, Chicago: University of Chicago Press.

Sankey, H. (1995) 'The Semantic Stance of Scientific Entity Realism', *Philosophia*, vol. 24 (3-4): 405-15.

WEEK 13: Structural Realism I

Essential Reading:

Worrall, J. (1989) 'Structural Realism: The Best of Both Worlds?' in Papineau, D. (ed.) *The Philosophy of Science*, Oxford: Oxford University Press, 1996.

Further Reading:

Maxwell, G. (1970) 'Structural Realism and the Meaning of Theoretical Terms', in S. Winokur and M. Radner (eds.) *Analyses of Theories, and Methods of Physics and Psychology*, Minneapolis: University of Minnesota Press, 181-192.

Redhead, M.L.G. (2001) 'The Intelligibility of the Universe', in A.O'Hear (ed.) *Philosophy at the New Millennium*, Cambridge: Cambridge University Press, pp. 73-90.

Votsis, I. (unpublished) 'Tracing the Development of Structural Realism',
<http://www.votsis.org/papers.htm>

WEEK 14: Structural Realism II

Essential Reading:

Psillos, S. (1999) 'Worrall's Structural Realism' in *Scientific Realism: How Science Tracks Truth*, London: Routledge, ch. 7.

Further Reading:

Psillos, S. (2001) 'Is Structural Realism Possible?', *Philosophy of Science* (Supplement), vol. 68: S13-24.

Van Fraassen, B.C. (2006) 'Structure: Its Shadow and Substance', *British Journal for the Philosophy of Science*, vol. 57(2): 275-307.

Votsis, I. (2005) 'The Upward Path to Structural Realism', *Philosophy of Science*, vol. 72(5): 1361-1372. (<http://www.votsis.org/papers.htm>)

WEEK 15: Social Constructivism

Essential Reading:

Brown, J.R. (1994) 'Latour's Prosaic Science', in *Smoke and Mirrors: How Science Reflects Reality*, London: Routledge, ch. 3.

Latour, B. (1988) 'The Politics of Explanation: An Alternative' in Steve Woolgar (ed.) *Knowledge and Reflexivity*, New Frontiers in the Sociology of Knowledge Sage, London, pp.155-177.
(<http://www.ensmp.fr/~latour/articles/article/032.html>)

Further Reading:

Barnes, B. and D. Bloor (1982) 'Relativism, Rationalism and the Sociology of Knowledge' in Hollis and Lukes (eds.) *Rationality and Relativism*, Cambridge: MIT Press.

Latour, B., and S. Woolgar (1986) *Laboratory Life: The Social Construction of Scientific Facts*, Princeton: Princeton University Press.

Nelson, A. (1994) 'How could scientific facts be socially constructed?', *Studies in History and Philosophy of Science*, vol. 25(4): 535-47.