

**CS Philosophy of Science B**  
**Laws, models, and idealizations**

Thomas Müller

WBMA3062

---

Time: Tuesday, 19:00–22:00  
Place: Ruppertgebouw 121  
Meetings: 13 Nov 2007 – 22 Jan 2008  
Docent: Dr. Thomas Müller  
Office: Bestuursgebouw 173  
Email: Thomas.Mueller@phil.uu.nl

### Course layout

**13 Nov:** Introduction, distribution of topics for class presentations. Discussion of historical texts that were distributed beforehand (David Hume, *Enquiry Concerning Human Understanding* (1748), Sec. X, “Of Miracles”, § 90–91; Immanuel Kant, *Metaphysical Foundations of Natural Science* (1786), Preface, p. 184 top–p. 186 top)

#### Part I: Laws of nature

**20 Nov:** “Classical” positions regarding laws (mostly recap)

1. C.G. Hempel, *Philosophy of Natural Science* (Englewood Cliffs 1966), Chap. 5 (“Laws and their role in scientific explanation”, 47–69) [**Harmen Ghijzen**]
2. F.I. Dretske, “Laws of nature”, *Philosophy of Science* 44:248–268 (1977) [–]
3. D. Lewis, *Counterfactuals* (Oxford 1973), Sec. 3.3 (pp. 72–77) [**Wim Villerius**]

**27 Nov:** Laws and scientific practice

1. I. Hacking, *Representing and Intervening* (Cambridge 1983), Chap. 9 (“Experiment”, 149–166) [–]
2. N. Cartwright, *How the Laws of Physics Lie* (Oxford 1983), Essay 6 (“For phenomenological laws”, 100–127) [**Alessia Tosi**]
3. H. Kincaid, “Defending laws in the social sciences”, *Philosophy of Social Science* 20:56–83 (1990; also reprinted in M. Martin and L.C. McIntyre, eds., *Readings in the Philosophy of the Social Sciences*, Cambridge MA 1994) [–]

**4 Dec:** No laws?

1. B.C. Van Fraassen, *Laws and Symmetry* (Oxford 1989), Chap. 2 (“What are laws of nature?”, 17–39) [**Wim Villerius**]
2. *op. cit.*, Chap. 8 (“What if there are no laws? A manifesto”, only pp. 183–194 (Sec. 8.1–8.3) and pp. 210–214 (Sec. 8.6)) [–]
3. R. Giere, *Science Without Laws* (Chicago 1999), Chap. 5 (“Science without laws of nature”, 84–96) [**Bart Boermans**]
4. N. Cartwright, *The Dappled World* (Cambridge 1999), Chap. 1 (“Fundamentalism versus the patchwork of laws”, 23–34) [–]

**Additional reading:** Van Fraassen, *Laws and Symmetry*, Chap. 3–5; Cartwright, “Causal laws and effective strategies”, *Noûs* 13:419–437 (1979; also in part as Essay 1 in *How the Laws of Physics Lie*); Cartwright, *The Dappled World*, Part II

### **Part II.a: Idealizations – *ceteris paribus* clauses**

**11 Dec:** How to deal with *ceteris paribus* clauses

1. S. Smith, “Violated laws, *ceteris paribus* clauses, and capacities”, *Synthese* 130(2), 235–264 (2002) [**Medhat Elsayed**]
2. M.A. Schrenk, “Can capacities rescue us from *ceteris paribus* laws?”, in M. Kistler, B. Gnasounou (eds.), *Dispositions in Philosophy and Science* (Ashgate 2007), 221–247 [**Alessia Tosi**]

**Additional reading:** P.M. Pietorsky and G. Rey, “When other things aren’t equal: Saving *ceteris paribus* laws from vacuity”, *British Journal for the Philosophy of Science*, 46:81–110 (1995; a classic); papers from *Erkenntnis* 57(3) (special issue on *ceteris paribus* laws, 2002); G. Keil, *Handeln und Verursachen* (Frankfurt 2000, in German)

### **Part II.b: Idealizations – models**

**18 Dec:** The use of models in science

1. P. Suppes, “A comparison of the meaning and uses of models in mathematics and the empirical sciences”, *Synthese* 12:287–301 (1960) [**Barry Nouwt**]
2. M.S. Morgan and M. Morrison (eds.), *Models as Mediators* (Cambridge 1999), “Introduction” (1–9) [**Bart Kamphorst**]
3. A. Bokulich, “Horizontal models: From bakers to cats”, *Philosophy of Science* 70:609–627 (2003) [**Arlette van Wissen**]

**8 Jan:** Current topics: data models and model explanation

1. T. Harris, “Data Models and the Acquisition and Manipulation of Data”, *Philosophy of Science* 70:1508–1517 (2003) [**no presentation**]
2. B.C. Van Fraassen, *Scientific Representation: Paradoxes of Perspective*, II-3 and 4 (Measurement as Representation) [**Gerard Klijs**]
3. a manuscript on model explanation (text to be distributed later) [?]

**Additional reading:** An up-to-date overview is given by R. Frigg and S. Hartmann, “Models in science”, *Stanford Encyclopedia of Philosophy* (plato.stanford.edu, 2006)

### Part III: Causation

**15 Jan:** Problems

1. D. Hume, *Enquiries Concerning Human Understanding* (1748), Sec. VII (“Of the idea of necessary connexion”) [**no presentation**]
2. G.E.M. Anscombe, *Causality and Determination* (Cambridge 1971; reprinted in *The Collected Philosophical Papers of G.E.M. Anscombe, Vol. 2* (Oxford 1981), 133–147) [**Jilles Smids**]
3. A.N. Prior, *Papers on Time and Tense* (Oxford 1968), Chap. 6 (“Limited Indeterminism”, 59–65) [**James Bachmann**]

**22 Jan:** The manipulability account: a solution?

1. P. Menzies and H. Price, “Causation as a secondary quality”, *British Journal for the Philosophy of Science* 44(2):187–203 (1993) [**Fieke Boschman**]
2. D.M. Hausman, “Causation, agency, and independence”, *Philosophy of Science* Suppl. 64: S15–S24 (1997) [**no presentation**]
3. J. Woodward, “Causation and manipulability”, *Stanford Encyclopedia of Philosophy* (plato.stanford.edu, 2001) [**Dirk van Schepen**]

**Additional reading:** D. Lewis, “Causation”, *Journal of Philosophy* 70:556–567 (1973) (reprinted, with a number of postscripts, in *Philosophical Papers, Vol. II*, Oxford 1986); N. Cartwright, *Nature’s Capacities and Their Measurement* (Oxford 1989), Chap. 3 (“Singular causes first”); *The Journal of Philosophy* 97(4) (special issue on causation, 2000)

## Course requirements

### Active participation and interaction with others

You are expected to attend all seminar sessions and prepare for them carefully. Part of your preparation must be documented via short written assignments (see below). You are also expected to interact with your fellow students by commenting on their work and continuing discussion with them after class. To this end, the use of the BSCW system is strongly encouraged. When posting on this platform, please use only openly documented file formats such as plain text or PDF (i.e., do *not* post DOC files or files in other proprietary formats; not everybody can read them).

### Final grade

Active participation is a precondition for obtaining a grade. The grade itself is determined via three components:

**Class presentation (20%):** Each student will present one of the assigned texts in class (10–15min). The idea behind this is not a comprehensive survey of the text, but a structured exposition that helps to initiate discussion. A handout summarizing the main points is part of the presentation; this handout should be posted on BSCW.

**Written assignments (40%):** For each of the sessions, each student will prepare a written assignment that develops and defends one or two theses for discussion of one of the assigned papers (roughly 300–600 words). Indicate the date, your name, the text on which you write, and state your theses clearly before developing them. The **deadline** for handing in a printout is the **beginning of the session**. Students are also strongly encouraged to post their theses on BSCW. The grade for this part will be determined as the average grade of the four best assignments. Assignments are judged mainly for clarity of exposition and accuracy of presentation.

**Final paper (40%):** Each student will write a 3000–5000 word paper (in English) on a subject related to the themes discussed in the course. The topic of the paper, in the form of a written research problem, has to be handed in three weeks prior to the paper deadline. Students are encouraged to post their research problems on BSCW in order to facilitate discussion with other participants. **Deadline** for the **research problem** is **15 January 2008**, for the **final paper**, **5 February 2008**. The paper needs to have (i) a cover sheet indicating the title, your name and e-mail address, the course number and the date; (ii) an introduction stating the research problem and the goal of the paper; (iii) a main part; (iv) a conclusion and (v) a list of references consistently formatted in some standard style.

In the assessment of the paper, emphasis will be placed on the research problem and goal, on argumentative coherence and fairness, understanding of the relevant issues, originality, form, and clarity of writing.