

PHIL 285
PHYSICS AND THE METAPHYSICS OF FUNDAMENTALITY
SYLLABUS AND INTRODUCTION¹

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Seminars: Wednesday 4-6.50pm, 7077

Office Hours: Thursday 10am–12pm, 8088

1 Introduction.

A significant change is underway in analytic metaphysics. For half a century after Quine's 'On What There Is', the study of ontology was predominantly focused upon questions of existence. More recently, however, many philosophers have urged that the most interesting metaphysical questions do not revolve around what there is, but rather around what is *ontologically prior* to what. Such a metaphysics portrays the world as structured into layers, stratified according to the more and the less fundamental; as a result, this new approach to ontology places the concept of *fundamentality* centre-stage. But through this transition it has remained the case that contemporary metaphysics overwhelmingly subscribes to *physicalism* – the view that the actual world is fundamentally physical in nature. Such a view must entail naturalistic commitments of some sort, though what exactly these consist of is a matter of some dispute.

This course will investigate the stratified picture of reality emerging in contemporary metaphysics from a naturalistic perspective. We will study in some detail the concepts associated with this reorientation in metaphysics and thus develop a firm grounding in a key contemporary theme. But we will also critically evaluate the standing of the a priori assumptions contained within this contemporary work from a broadly scientific point of view. As such, we'll become proficient in a central topic in metaphysics whilst also acquainting ourselves with themes in contemporary philosophy of science, and in so doing be encouraged to reflect on the methodological demands implicit in 'naturalistic metaphysics' – a theme gaining increasing prominence in its own right.

2 Assessment.

Critical summaries. You will be required to write 3 short critical summaries at the end of each tranche of the course, each worth 10%. These should be between 1000 and 1500 words in length. Provide references where appropriate. The aim here is to show me that you understand the basic points of contention in each area. NB: for Tranche 2, you may write about either the existence of a fundamental level or about structuralism. (There's probably not enough time and space to cover both adequately, but if you think you can pull it off and have a burning desire to do so then by all means do.)

¹filename: 285.1.Intro.tex

Participation. Your participation will also be graded and worth 10%. Note that I may ask you to give a short and informal presentation on one or two of the readings.

Paper proposal. The paper proposal will consist of two parts. The first part will explain and motivate the focus of your research by answering these questions. (1) What is the general topic area? (2) What are the main views on the topic? (3) What will your focus in that area be? The second part of your proposal will give a section-by-section outline of what you propose to write. This proposal will be discussed in detail with me and will serve as your research plan. This is a pass / fail exercise, and try to keep it short and sweet. I have some suggested titles for your essay, but you are welcome to write on a topic of your choice **provided** it is cleared with me in advance.

Final paper. Your final paper will be worth 60% of the mark, be 5,000-6,000 words in length, and should draw on material from at least two tranches of the course.

Grading scale.

95 – 100 = A ⁺	78-80=B ⁺	68-70=C ⁺	58-60=D ⁺
85-94=A	75-77=B	65-67=C	50-57=D
81-84=A ⁻	71-74=B ⁻	61-64=C ⁻	< 50=F

Academic Integrity.

UCSD is committed to academic integrity. According to their *Policy on Integrity of Scholarship*²,

"Integrity of scholarship is essential for an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University intellectual work. For students, this means that all academic work will be done by the individual to whom it is assigned, without unauthorized aid of any kind.

If you are at all unsure of what acting with integrity demands of you in this context, I'll be happy to discuss it with you.

3 Structure.

There are three broad topics we'll be focussing on in this course, and these are as follows. (1) *The conceptual aspects of fundamentality.* How should *ontological priority* be understood? What does it mean to call something fundamental? (2) *The locus of fundamentality.* What, if anything, is fundamental in this world? Is there a fundamental *level* of some sort? What is the fundamental *category*? (3) *The methodology of fundamentality.* Questions about fundamentality seem to involve both traditional metaphysics and contemporary science, but what should the interplay between these two forms of enquiry be?

²Go to <https://students.ucsd.edu/academics/academic-integrity/policy.html>

As is often unavoidable, reading requirements will be heavier at the beginning, but I have tried to flag up opportunities for corner-cutting. Any reading that I have not explicitly said I'll be handing out should be available easily through a google search or through the library catalogue – if you have any trouble getting your hands on anything, just let me know. One issue worth pointing out right at the beginning is that this is a relatively new topic (at least in the form we'll be concerned with). Thus there isn't too much literature dedicated specifically to many of the things we will look at, and that has advantages and disadvantages. Don't hesitate to get in touch if you are struggling with any of the readings, or feel like you need something else or something more.

1. **Introduction.** We will read and discuss two pieces that will help get us in the right frame of mind. Readings: Jonathan Schaffer's 'On What Grounds What' and Ladyman and Ross, Chapter 1 of *Every Thing Must Go*, to end of Section 1.6 if you can. (NB: both of these are long, but nothing rests on the details at this stage. So don't be afraid to skim portions.) Schaffer's piece will give us some background to the shift in analytic metaphysics outlined above. Ladyman and Ross' polemical piece is an attack on the methods employed in contemporary metaphysics, which raises a number of issues we will return to in the last tranche of the course.

TRANCHE 1: CONCEPTIONS OF FUNDAMENTALITY

2. **General Conceptions of Fundamentality 1.** Our focus in Tranche 1 will be on how to understand the notion of ontological priority, and in this and the next seminar we will discuss what it means to regard some entity as more fundamental than something else. In particular, we will focus on the relations of *supervenience* and *ontological dependence* as ways of expressing priority. The issue we will consider in this seminar is whether we need both relations to express fundamentality claims. To satisfy yourself that supervenience is a relation used to express priority claims, read sections 1-3 of 'Physicalism, Supervenience and the Fundamental Level' by Ladyman and Brown. (If you are already familiar with that idea, feel free to skip it.) To establish that supervenience and ontological dependence are different relations, read Yoshimi, 'Supervenience, Determination and Dependence', Sections 1-5. (Here again be judicious in your reading, depending on how familiar you are with supervenience.) To make the case that we might need a relation of dependence in order to express the idea that wholes are less fundamental than their parts, read the pieced-together hybrid of Maudlin's 'Part and Whole in Quantum Physics' and 'Why be Humean?'. I will do my best to unpack what's going on in the Maudlin reading in class.
3. **General Conceptions of Fundamentality 2.** We will continue our discussion of relations of priority by considering relations of priority in more detail, addressing in particular the issue of whether we can understand priority in purely modal terms. The readings will focus on the relation of dependence in particular, but we will think about whether the same sort of ideas can

be exported to supervenience. (NB: the idea that priority-as-determination cannot be defined modally is the motivation for the mushrooming of papers in the metaphysics journals on the notion of ‘grounding’.) Readings are Kit Fine’s ‘Ontological Dependence’, Secs 1-3 (esp. 1 and 2); Nathan Wildman, ‘Sparseness, Modality and Essence’ (to be distributed).

TRANCHE 2: THE LOCUS OF FUNDAMENTALITY

4. **The Existence of a Fundamental Level 1.** In this and the next seminar we will consider some arguments for and against the existence of a fundamental *level*. The main reading for this seminar is Cameron’s ‘Turtles All the Way Down: Regress, Priority and Fundamentality’. We will consider some arguments from the history of philosophy for similar conclusions as well, and discuss the notion of ‘theoretical virtues’ and their role in theory choice (one or useful references on this issue included in handout). If you are able to, read Ricki Bliss, ‘Viciousness and the Structure of Reality’.
5. **The Existence of a Fundamental Level 2.** In this class we will consider whether and how we might positively deny the existence of a fundamental level. The main reading for this is Schaffer’s ‘Is There a Fundamental Level?’. (Note however that there is a lot of padding in this article and his major argument is basically contained in the last full paragraph on page 502! Do try to read more though.) A good critical piece on this is Craig Callender’s ‘Why be a fundamentalist? – Reply to Schaffer’, which was a commentary at the APA one year and is available on the philsci archive (<http://philsci-archive.pitt.edu/>). Some relevant points from this will be included in the handout. While I will not ask you to read it, I will introduce the thrust behind my paper ‘Arguing Against Fundamentality’, and we will discuss the advantages and the limitations of using science to deny the existence of a fundamental level.
6. **The Fundamental Category 1.** In this section we will consider some issues concerning what the fundamental category of the world is. We will introduce this topic by first acquainting ourselves with the topic of structural realism. Our reading will consist of two of the most important papers in philosophy of science (at least of recent memory): Larry Laudan’s ‘A Confutation of Convergent Realism’ (slightly truncated version to be put on Blackboard), and John Worrall’s ‘Structural Realism: The Best of Both Worlds?’. These are classics that you should read regardless!
7. **The Fundamental Category 2.** We will continue our look at structuralism by thinking about ‘ontic’ structural realism in the context of quantum mechanics. In particular, we will think about how structuralists ask us to reconceive of quantum particles. We will consider their state-dependent (i.e. changeable) properties first, and here readings will include Saunders, ‘Physics and Leibniz’s Principles’, Sections 1 and 2, and portions of Ladyman and Ross.

8. **The Fundamental Category 3.** In this seminar we will think a bit about the understanding contemporary particle physicists have of the state-independent properties of quantum systems, an understanding which proceeds via the notion of *symmetries*. Throughout the 20th century, physicists have been able to use symmetry to predict the existence of particles never before seen – the Higgs particle being only the latest. This newfound ability arguably represents a profound new phase in our understanding of matter. Structuralists in particular have argued that these developments in physics show that the so-called ‘fundamental particles’ aren’t really fundamental at all: rather, that accolade belongs to the notion of symmetry structure. I’ll try to explain what’s going on here, and we will think collectively about how convincing those arguments are. I have yet to find suitable readings for this, but watch this space!

TRANCHE 3: THE METHODOLOGY OF FUNDAMENTALITY

9. **Methodology 1.** Right at the beginning we looked at one extreme view on the usefulness of scientifically disinterested metaphysics. But now that we have completed the first two parts of the course we are in a position to develop a more nuanced picture of the physics–metaphysics relationship than is found either in Ladyman and Ross, Chapter 1, or implicitly in e.g. the Cameron piece (which gives the impression that science has nothing at all to contribute on fundamentality). Readings for this seminar are L.A. Paul, ‘Metaphysics as Modelling: The Handmaiden’s Tale’, and Callender’s ‘Philosophy of Science and Metaphysics’.
10. **Methodology 2.** In our final discussion, we will read and rip apart French and McKenzie’s ‘Rethinking Outside the Toolbox’.

4 Possible Essay Questions

Below are some sample essay questions. You are welcome to either select from this list or write on a topic of your own choice, **provided** it is cleared with me in advance.

Tranche 1: conceptions of fundamentality

1. Describe one or some of the challenges relating to the definition of a levels hierarchy. (You may wish to focus on one, some or all of: the usefulness of mereological composition; criteria identifying priority relations; the possibility of, and challenges posed by, the existence of non-coextensive priority relations.)
2. How should we characterize the fundamental?
3. Are either or both of supervenience /ontological dependence a relation of ontological priority?
4. Can priority be defined modally?

Tranche 2: the locus of fundamentality

5. Should we believe in the existence of a fundamental level to the actual world?
5. Is a fundamental level any more plausible than a 'first cause'?
5. Is it possible to deny the existence of a fundamental level to the actual world?
5. Should we believe the structuralist claim that so-called 'elementary particles' such as electrons are not ontologically fundamental ?
5. What does physics suggest we take as the fundamental category?

Tranche 3: the methodology of fundamentality

10. Discuss the ways in which the issue of fundamentality can illuminate the interdependence or otherwise of science and armchair metaphysics.
20. Do developments in 20th century physics suggest that analytic metaphysics should be 'discontinued'?