NYU PHIL-GA 1104, Fall 2026

ADVANCED INTRO TO PHILOSOPHY OF SCIENCE
EXPLANATION & CATEGORIZATION

Time & Place Wednesdays 4–6 PM
Second floor seminar room, 5 Washington Place

Texts All readings will be distributed via NYU Brightspace and on Michael's web site (password required; will be distributed in class)

Topics We'll look at the major approaches to scientific explanation, with special attention to issues about high-level explanation as they arise in equilibrium models, statistical models, black-boxing models, and "distinctively mathematical" explanations. We'll also look at the place of natural kinds in the science, and some issues about scientific categories (biological sex, species, etc.) more generally.

Evaluation Your total grade will be determined by two 4000–5000 word papers, equally weighted.

Due dates: Nov 4th, Dec 16th

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AI Policy We believe that students will get much more from the coursework if they write their essays the traditional way: by engaging with the readings, formulating responses to them, and composing their own prose. Consequently, for the purposes of this class, those who choose to use generative AI as an aid should restrict its use to facilitating literature review and proofreading. Using AI to compose sentences or supply ideas is strictly forbidden.

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READINGS

EXPLANATION & CATEGORIZATION

Explanation Boot Camp

Sep 2 Everything begins with Hempel: The DN account
- ▷ Hempel and Oppenheim, "Studies in the logic of explanation", pp. 135–141
- ▷ Salmon's counterexamples to the DN account (*Four Decades*, pp. 46–50)

Sep 9 Explanation as unification
- ▷ Kitcher, "Explanatory unification"
- ▷ Barnes, "Explanatory unification and the problem of asymmetry"

Sep 16 Causal theories of explanation
- ▷ Strevens, "The causal and unification approaches to explanation unified—causally"
- ▷ Woodward, "Explanatory autonomy: The role of proportionality, stability, and conditional irrelevance", §§1–4

High-Level Explanation

Sep 23 Equilibrium explanation
- ▷ Sperry-Taylor, "Reassessing equilibrium explanations: When are they causal explanations?"
- ▷ Vallejos-Baccelliere and Vecchi, "Searching for protein folding mechanisms", §§6.1–6.3

Sep 30 Probabilistic explanation: the 20th century
- ▷ Hempel, *Aspects of Scientific Explanation*, §12.3 (especially pp. 381–405)
- ▷ Railton, "Probability, explanation, and information"

Oct 7 Probabilistic explanation: the 21st century
- ▷ Gallow, "A subjectivist's guide to deterministic chance", §§ 1, 2, 4.0, 4.4, 5 (i.e., the part of section 4 until 4.1 begins and then 4.4)
- ▷ Ariew et al., "Galton, reversion and the quincunx: The rise of statistical explanation"

Oct 14 Legislative Monday – no class

Oct 21 Black boxes in explanation
- ▷ Siegel and Craver, "Phenomenological laws and mechanistic explanations"
- ▷ Potochnik, "Optimality modeling and explanatory generality"

Oct 28 Mathematics in scientific explanation
- ▷ Lange, "What makes a scientific explanation distinctively mathematical?"
- ▷ Craver and Povich, "The directionality of distinctively mathematical explanations"

Categorization

Nov 4 Introduction to natural kinds: Origins and essentialism ◁ *Due date*
- ▷ Mill, *A System of Logic*, Book I, Ch. VII, §4, "Kinds have a real existence in nature"
- ▷ Quine, "Natural kinds"
- ▷ Ellis, "Natural kinds and natural kind reasoning"
- ■ First paper due

Nov 11 Homeostatic property cluster kinds
- ▷ Boyd, "Realism, anti-foundationalism and the enthusiasm for natural kinds"
- ▷ Wilson, Barker, and Brigandt, "When traditional essentialism fails: biological natural kinds"

Nov 18 Species and other historical kinds
- ▷ Millikan, "Historical kinds and the 'special sciences'"
- ▷ Khalidi, "Etiological kinds"
- ▷ Franklin-Hall, "Historical vs. synchronic kinds"

Nov 25 The messiness of kinds: Pluralism and scale variation
- ▷ Dupré, *The Disorder of Things*, chapter 1
- ▷ Bursten, "Smaller than a breadbox: Scale and natural kinds"
- ■ This class will either be rescheduled or will be conducted over Zoom

Dec 2 Pragmatism and human kinds
- ▷ Kitcher, "Does 'race' have a future?"
- ▷ Hacking, "Making up people"

Dec 9 The sexes and the future of natural kinds
- ▷ Franklin-Hall, "The animal sexes as historical explanatory kinds"
- ▷ Watkins and DiMarco, "Sex eliminativism"
- ▷ Papale and Montminy, "Natural kinds: The expendables"

Papers are due on Nov 4th and Dec 16th