Journée d'étude sur la philosophie naturelle de Isaac Newton

Jeudi 14 mars, 14h-17h

Université Paris Diderot,

bâtiment Condorcet, salle Gris 734A, 4, rue Elsa Morante, 75013 Paris

Président : Justin E. H. SMITH (Paris 7 – Paris Diderot)

14h-14h50

ADWAIT PARKER (Stanford/Paris Diderot)

"Newton, the Third Law, and Active Quantity of Matter"

14h50-15h15

ADRIAN CURRIE (Exeter)

Comments on Adwait Parker

15h30-16h20

KIRSTEN WALSH (Exeter)

"Newton's Scaffolding: The Instrumental Role of His Optical Hypotheses"

16h20-16h45

ANNE-LISE REY (Nanterre)

Comments on Kirsten Walsh

ABSTRACTS

"Newton, the Third Law, and Active Quantity of Matter"

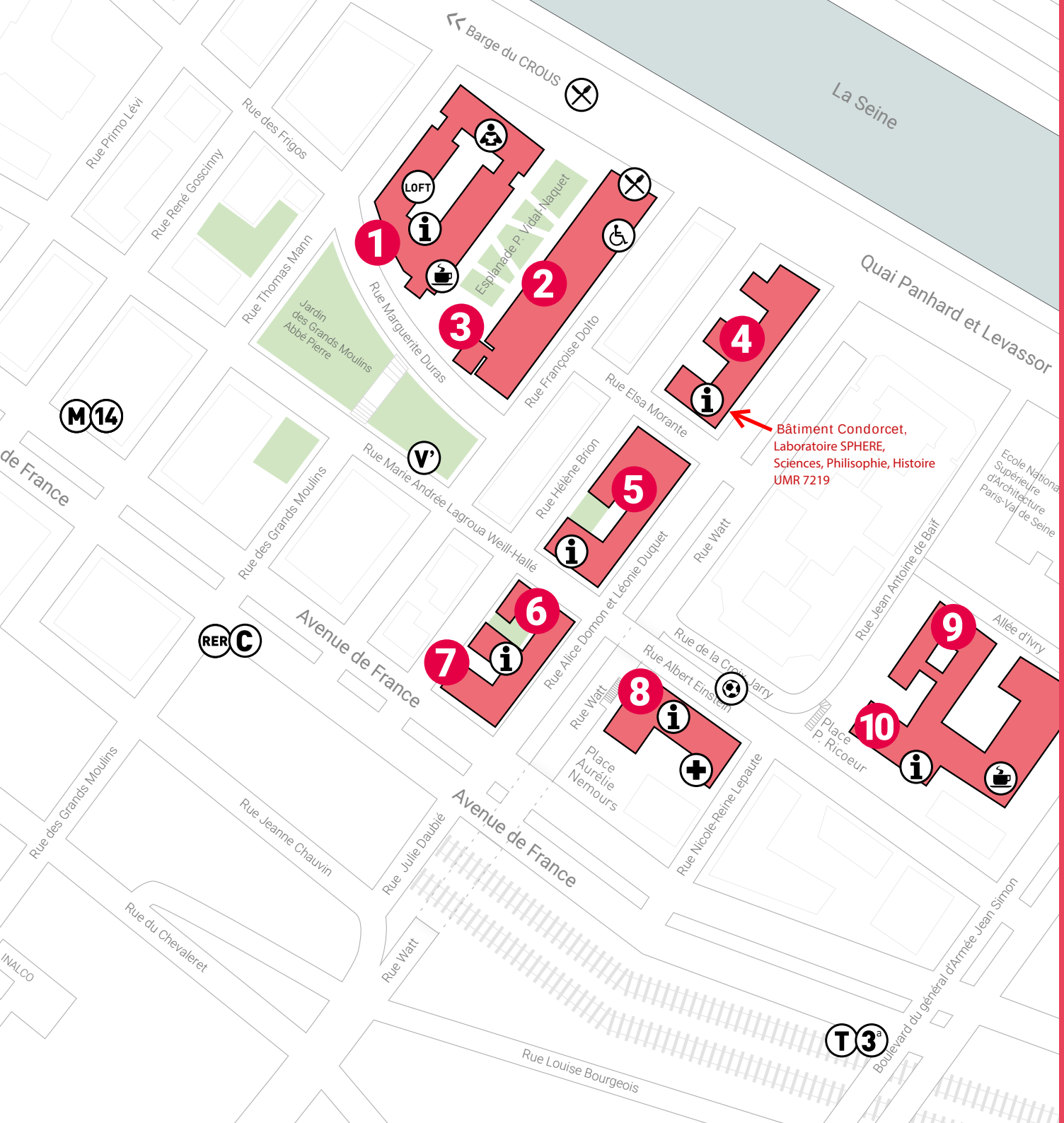
ADWAIT PARKER (Stanford, Paris Diderot)

Newton's argument for universal gravity in Book III, Proposition 7, of *Principia* (1687) faced a well-known objection. He had no empirical evidence that the third law of motion applies to gravity, but needed to assume this to demonstrate gravitational interaction is proportional to the mass of even the attracting body. In this paper, I argue Newton was aware of an even deeper, associated problem that his critics seem to have missed. First, I show that by spring of 1685, Newton had distinguished active and passive quantities of matter, a distinction we normally associate with the 20th century. Second, I show that, in the initial version of Book III, Newton struggled to articulate a conception of the third law of motion which would allow active quantity of matter to inherit the additive structure of passive quantity of matter. He recognized this need to deduce particle-to-particle interaction. Third, I show this distinction and these struggles are subtly reflected in the language of Book III, Proposition 7, and in other important places of Principia. In place of empirical evidence for the composition of attractions, Newton consistently appealed to magnets. I contend this argument by analogy is not inconsistent with Newton's experimental philosophy. In fact, the development of potential theory in the 18th century shows Newton was sensitive to a meaningful problem.

"Newton's Scaffolding: The Instrumental Roles of His Optical Hypotheses"

KIRSTEN WALSH (Exeter)

Early modern experimental philosophers often appear to commit to, and utilize, corpuscular and mechanical hypotheses. This is somewhat mysterious: such hypotheses frequently appear to be simply assumed, odd for a research program which emphasizes the careful experimental accumulation of facts. Isaac Newton was one such experimental philosopher, and his optical work is considered a clear example of the experimental method. Focusing on his optical investigations, I identify three roles for hypotheses. Firstly, Newton introduces a hypothesis to explicate his abstract theory. The purpose here is primarily to improve understanding or uptake of the theory. Secondly, he uses a hypothesis as a platform from which to generate some crucial experiments to decide between competing accounts. The purpose here is to suggest experiments in order to bring a dispute to empirical resolution. Thirdly, he uses a hypothesis to suggest an underlying physical cause, which he then operationalizes and represents abstractly in his formal theory. The second and third roles are related in that they are both cases of scaffolding: hypotheses provide a temporary platform from which further experimental work and/or theorising can be carried out. In short, the entities and processes included in Newton's optical hypothesis are not simply assumed hypothetical posits. Rather, they play instrumental roles in Newton's experimental philosophy.



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