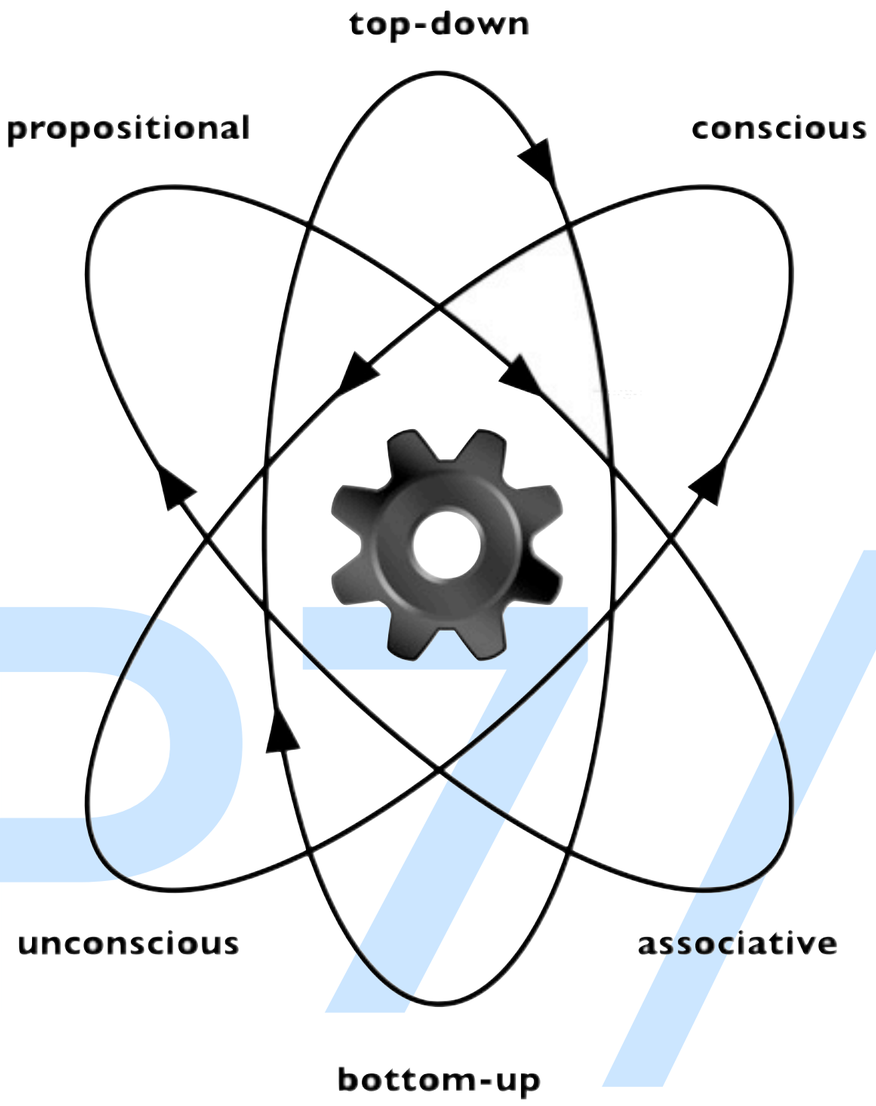
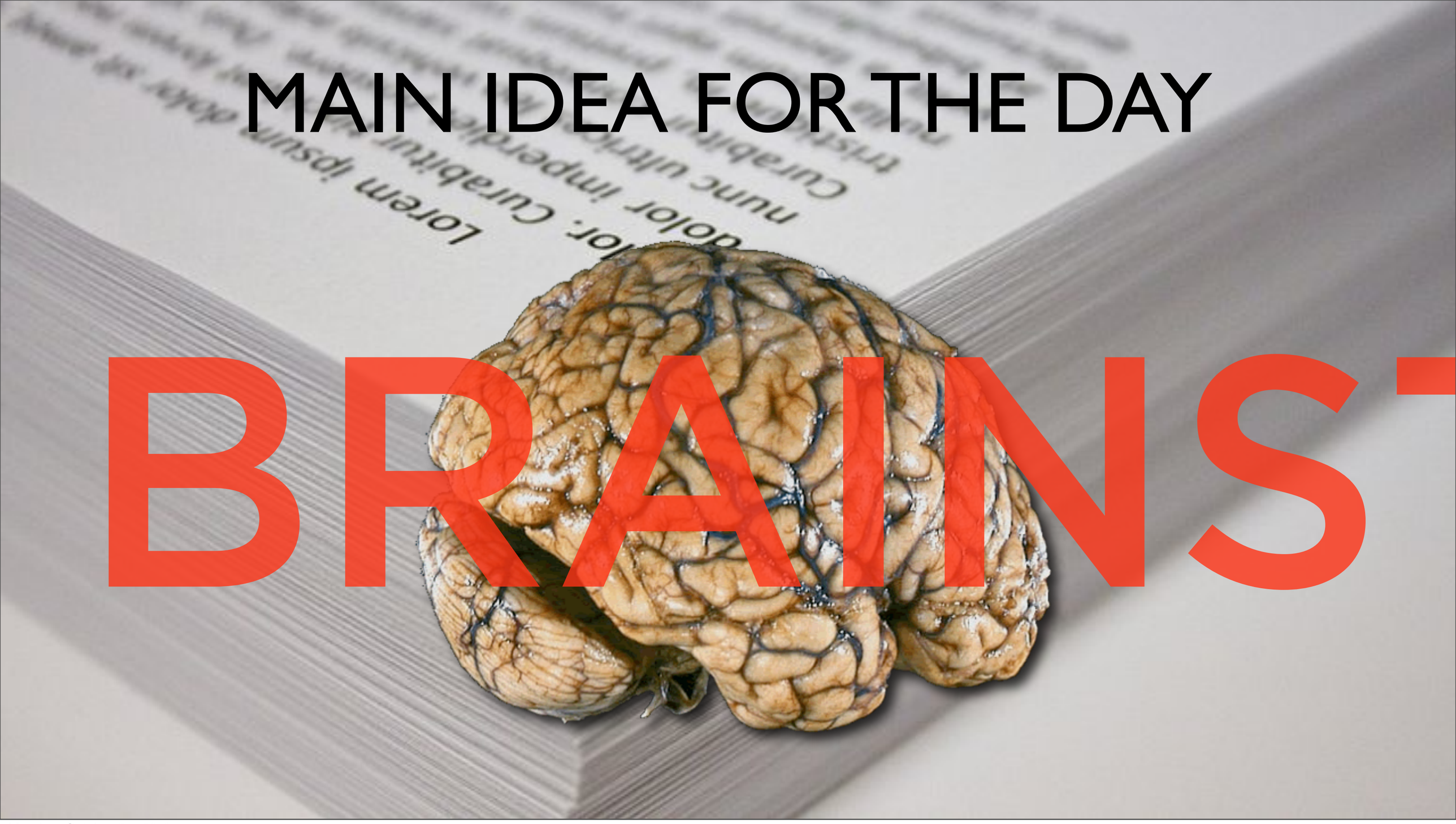


MECHANISMS OF CONSCIOUS AND UNCONSCIOUS LEARNING

IAP 7/33

- 5 years: 2012-2017
- approx 2.5M € budget
- 4 Belgian institutions (ULB, UCL, KUL, UG)
- 2 international partners (Sussex, UCLondon)
- 10 research teams
- about 65 people

MAIN IDEA FOR THE DAY



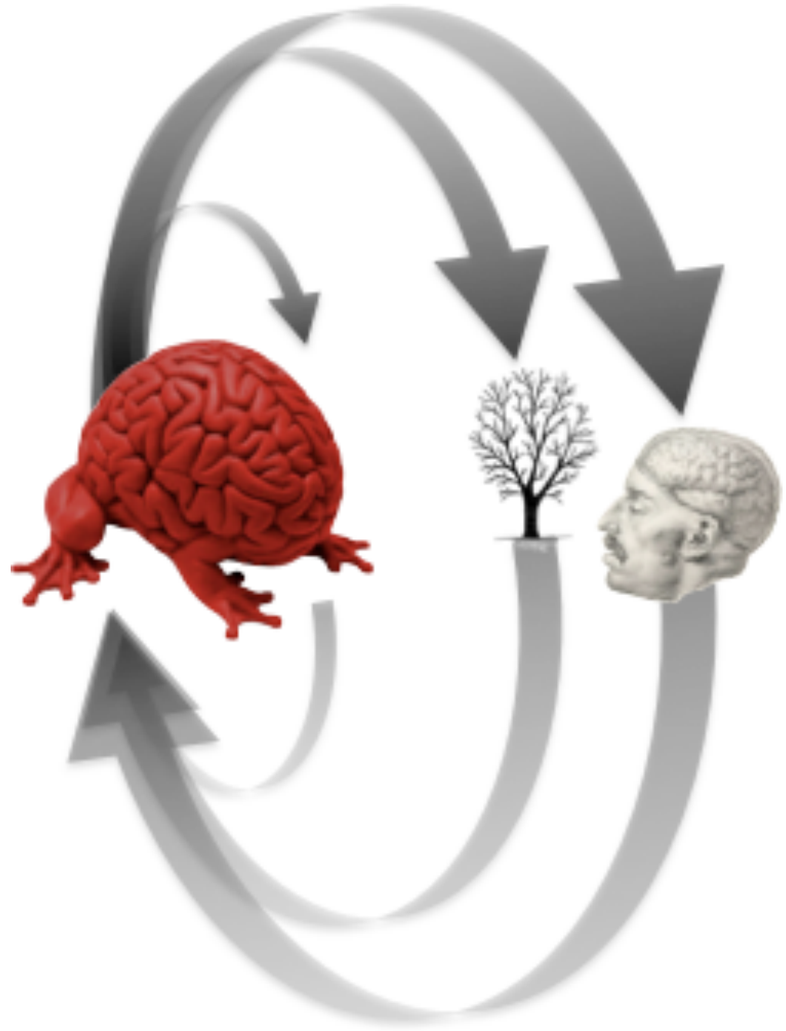
MAIN GOALS OF THE PROJECT

The overarching goal of this project is to contribute to our understanding of the mechanisms of conscious and unconscious learning.

- Research on learning continues to be unproductively **segregated into distinct subfields**
- The domain as whole also remains **very controversial**. Three controversies:
  - The **first** concerns whether learning depends on associative mechanisms, on effortful, intentional, propositional-like reasoning processes or on a combination of both.
  - The **second** controversial issue is the role that awareness plays in learning, and in particular, the extent and limits of what can be learnt without awareness.
  - The **third** controversial issue concerns the respective role of top-down and bottom-up learning mechanisms and the nature of their interactions (i.e., are phenomena such as conditioning penetrable to instructions?)
- Crucially, the poles of these different distinctions are **often cast as correlated**. Thus, we have one system that learns associations, automatically, in the absence of awareness, and that involves mostly bottom-up processes. The second system, by contrast, learns through hypothesis testing and inference, results in propositional representations that are available to consciousness, and involves top-down mechanisms.

cognitive
effortful
conscious
top-down

associative
automatic
unconscious
bottom-up



MAIN GOALS OF THE PROJECT

Here, **we propose to fundamentally reconsider the distinction.**

Instead of assuming that associative learning is always unconscious, automatic and bottom-up and that cognitive learning is always conscious, effortful and top- down, we propose instead that mechanisms of change operate continuously, at all levels of the cognitive hierarchy as well as over different times scales (i.e., over the time course of a single trial, over learning, and over development).

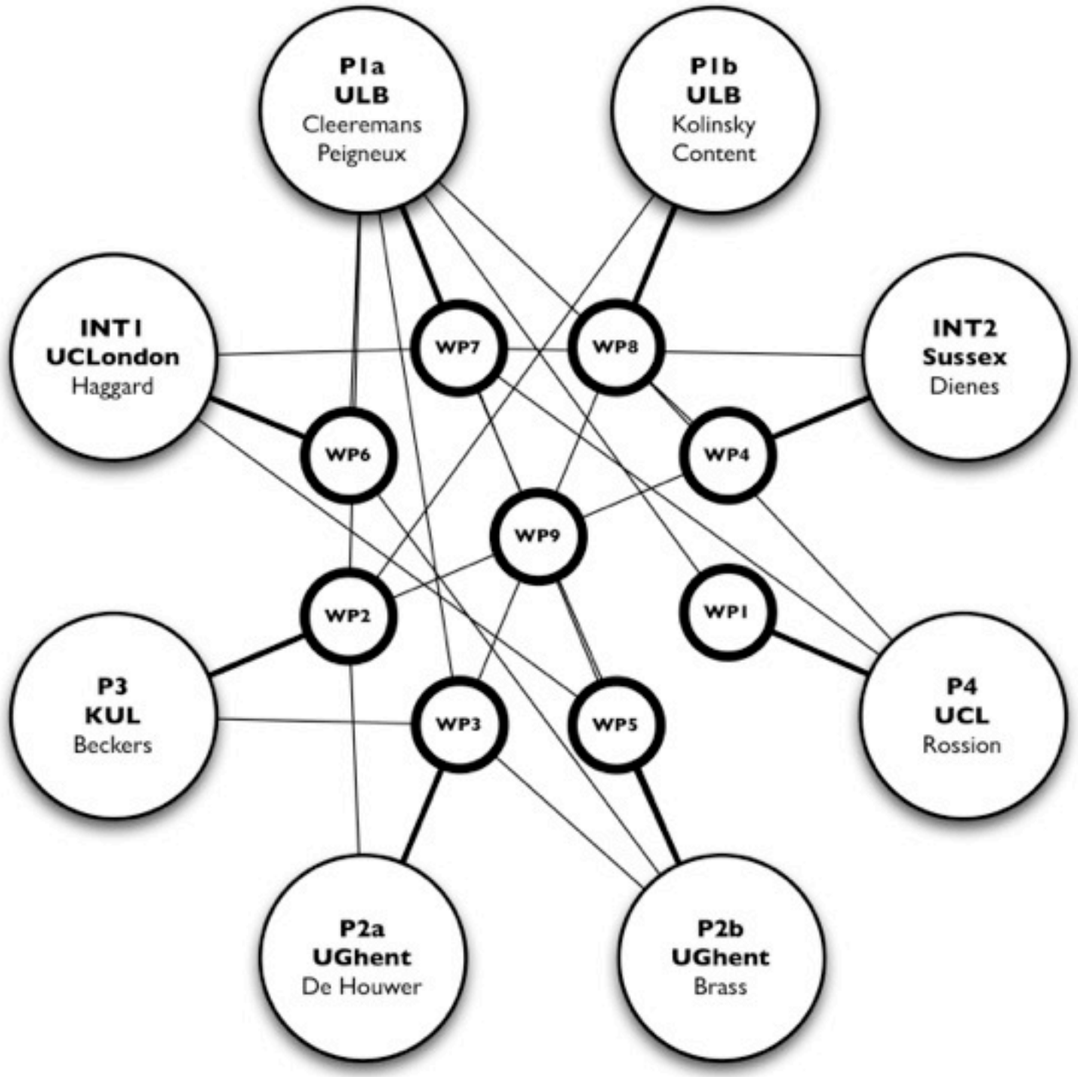
In this light, we will focus on exploring three central lines of research, as follows:

The **first issue** concerns the computational mechanisms and the neural correlates that subtend associative and cognitive learning, as well as their interactions. One set of questions concerns the extent and limits of each type of learning. Do associative learning mechanisms have sufficient power to account for *all* learning? Conversely, is there evidence for the involvement of symbolic, propositional-like representations in organisms that have typically been considered unable to carry out inferential processes?

The **second issue** concerns the relationships between awareness and learning. There continues to be considerable debate about the extent to which humans can learn without awareness, particularly in domains such as conditioning or implicit learning. Here, we will systematically probe the limits of what can be learned without awareness.

A **third issue** concerns the respective influences of top-down vs. bottom-up processes and their interactions. Functions like executive control and attention are typically considered to involve “top-down” mechanisms associated with awareness, but there is now both evidence for the possibility of unconscious executive control as well as evidence for the fact that attention can dissociate from consciousness· Particular emphasis will be put on understanding (1) how high-level processes such as reasoning, instruction-following and awareness can modulate lower-level, associative learning, and (2) how low-level, unconscious learning can shape further conscious, intentional processing, such as involved in decision-making or in action.

PROJECT STRUCTURE



PROGRAM

9:00 **Welcome coffee** (Room DB10-233 – 10th level of the building)

9:30 **Introduction** – Axel Cleeremans (Room DC2-223 – Ground floor)

10:00 **PI Presentations**

10:00 Jan De Houwer
10:10 Marcel Brass
10:20 Tom Beckers
10:30 Bruno Rossion
10:40 Zoltan Dienes
10:50 Patrick Haggard

11:00 **Coffee break** (Room DB10-233)

11:20 **PI Presentations** (Room DC2-223)

11:20 Alain Content (LCLD)
11:30 Régine Kolinsky (UNESCOG)
11:40 Philippe Peigneux (UR2NF)
11:50 Axel Cleeremans (CO3)

12:00 **Lunch** (Room DB10-233)

PROGRAM

13:00 **Administrative meeting (PIs only)** (Room DC10-219)

14:00 **WP Presentations** (Room DC2-233)

14:00 **WP1 - Rossion**/Peigneux
Mechanisms and dynamics of learning novel visual patterns

14:20 **WP2**
Beckers/DeHouwer/Cleeremans/Peigneux/Kolinsky
Mechanisms of conditioning and causal learning

14:40 **WP3 - De Houwer**/Cleeremans/Brass/Beckers
Mechanisms of learning via instructions

15:00 **WP4 - Dienes** /Cleeremans/Beckers
Mechanisms of implicit learning

15:20 **Coffee break** (Room DB10-233)

PROGRAM

15:50 **WP Presentations** (Room DC2-223)

15:50 **WP5 - Brass**/Cleeremans/ Haggard
Mechanisms of human decision making

16:10 **WP6 - Haggard**/Cleeremans/Brass
Mechanisms of instrumental learning

16:30 **WP7**
Cleeremans/Brass/Rossion/Haggard/Dienes
Mechanisms of awareness

16:50 **WP8 - Kolinsky**/Content/Rossion/De Houwer
Mechanisms of cultural learning

17:30 **Drink !** (Room DB10-233)