SEMINARIO

***Speaker*:**
Prof. Roberto Bottini
University of Trento

Looking for concepts. Semantic foraging in cognitive maps

***Quando*:**
16 dicembre 2025, ore 10:00

***Dove*:**
Sala Convegni CAST

Il Seminario è aperto a tutte e tutti gli interessati

Ud'A
Università degli Studi "G. d'Annunzio"

DNISC
Dipartimento di Neuroscienze, Imaging e Scienze Cliniche

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Dipartimento di Psicologia

Looking for concepts. Semantic foraging in cognitive maps

How do we search our own knowledge looking for relevant concepts and ideas? In this talk, I will propose that conceptual search is a form of “semantic foraging” in cognitive maps, expressed both in eye movements and hippocampal dynamics. First, I will show that when people retrieve concepts in complete darkness, their spontaneous eye movements are not random: gaze trajectories reflect the geometry of conceptual space, with shifts that scale with semantic distance and cluster within conceptual “patches,” suggesting that oculomotor exploration is coupled to internal navigation through abstract knowledge. Second, using intracranial EEG in patients performing a verbal fluency task, I will show that hippocampal theta power increases during conceptual search and tracks the semantic distance between successive words, and that transitions between semantic clusters—analogous to moves between foraging patches—are marked by enhanced theta–gamma coupling within the hippocampus and between hippocampus and lateral temporal cortex. Together, these results support a navigation-based account of memory search, in which the hippocampal–oculomotor system implements semantic foraging in cognitive maps.

Roberto Bottini is a cognitive neuroscientist at CIMeC, University of Trento, where he leads the Bottini Lab. His work examines cognitive maps and the geometry of thought across perception, action, and abstract cognition. He leads projects funded by the European Research Council (Starting, Consolidator, and Proof of Concept) and by the Italian Ministry of University and Research and collaborates internationally across cognitive neuroscience and psychology.