



**06**  
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📍 Salle de formation du PRABI

## SÉMINAIRE

# Ecological scaffolding during evolutionary transition in individuality.

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Evolutionary transitions in individuality are events in the history of life where a collection of entities come together to form collectives that are recognized as Darwinian individuals. The emergence of the eukaryotic cell from procaryotic ancestors and the evolution of multicellular from unicellular organisms are two prime examples of such transitions. Ecological interactions between their components can threaten the continued existence of these newly evolved collectives.

For instance, some lineages of entities can take over the ecosystem and cause the extinction of the higher-level entities before any propagule is sent out. In modern entities, conflict mediating mechanisms exist, from DNA copy-number control to cell-proliferation regulation.

However, their emergence through natural selection seems to imply that higher-level entities are units of selection. This is puzzling because higher-level entities are not units of selection at the beginning of a transition. The Ecological Scaffolding scenario of evolutionary transitions in individuality posits that a population structure, e.g., resource patches separated by boundaries with limited migration, could allow collectives that initially lack the Darwinian properties of variation, fitness difference and heritability to gradually acquire them and consequently explain the emergence of conflict mediation without initially positing collective-level selection. We will present a combination of mathematical, experimental and philosophical work that attempts to characterize better and understand the effect of scaffolding population structure in evolutionary transitions in individuality.