

## Time regained: how the brain accumulates and communicate memories as life unfolds over time?

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Models of working memory commonly focus on how information is encoded into and retrieved from storage at specific moments. However, in the majority of real-life processes, past information is used continuously to process incoming information across multiple timescales. Considering single unit, electrocorticography, and functional imaging data, we argue that (i) virtually all cortical circuits can accumulate information over time, and (ii) the timescales of accumulation vary hierarchically, from early sensory areas with short processing timescales (tens to hundreds of milliseconds) to higher-order areas with long processing timescales (many seconds to minutes). In this hierarchical systems perspective, memory is not restricted to a few localized stores, but is intrinsic to information processing that unfolds throughout the brain on multiple timescales.

**Monday, July 02<sup>nd</sup>, 2018 at 2:15 pm**

**MPIDS, Prandtl lecture hall, AI building,  
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