



Integrating Theoretical Frameworks and Computational Models: A Multidisciplinary Approach to Understanding Brain Function and Behavior

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Abstract

The human brain, a complex network of billions of neurons and synapses, continues to captivate scientists with its enigmatic workings. Unraveling brain function, from its fundamental chemical interactions to the manifestation of intricate behaviors and cognitive processes, stands as a pivotal challenge in modern neuroscience. This endeavor systems neuroscience, neuropsychology, and cognitive neuroscience. The present paper explores how theory and computer abstraction synergistically contribute to deciphering brain function, providing a pathway to bridge the gap between the molecular level and complex behavioral phenomena. Neurochemistry forms the foundation of this journey by investigating the roles of neurotransmitters and molecular messengers in the intricate web of neural & [{ ~ } ä&æcä [] EäP^~ : [æ) æc [{ "Éä } Ac " i } EÄ ~ } Ç^ä] • Äc @ ^ Ä • c i " & c " i æ] Ä [! * æ) ä : æcä [] } } ^ & cäcäc " Ä [- Ä] ^ ~ i æ] Ä ä i & " äc • ÉÄ [^ ä] * Ä vital clues to the information processing in the brain. Systems neuroscience complements this understanding by investigating the dynamics of neural networks and their role in generating behavior. In parallel, neuropsychology and & [*) äcäc^Ä] ^ ~ i [• ä^] & ^ Ä ^ ~ & ä ä æ ^ Ä c @ ^ Ä i : | æ cä [] • @ ä] Ä ä ^ c , ^ Ä] Ä ä i æ ä] Ä ä æ { æ * ^ Ä æ } ä Ä ä ^ @ æ cä [i æ] Ä ä ^ , & äc • ÉÄ ~ } Ç^ä] ä * Äc @ ^ Ä] ^ ~ i æ] Ä ä) c^ i : ! ^ cäc @ ^ Ä äc äc • cäc i [Ç^Ä • Ä [- Ä] ^ ~ i [• ä^] cä , & Ä ä æ c ä ÉÄ

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