

Cognitive Computational Neuroscience

Submission ID 3000220

Submission Type Poster

Topic Neuroscience

Status Submitted

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SUBMISSION DETAILS

Presentation Type Either Poster or Oral Presentation

Presentation Abstract Summary A computational account of brain information processing requires that we build computational models and test them with both brain and behavioral data. To explain intelligent behavior, these models will have to be able to perform complex cognitive tasks. Cognitive science has developed computational models of human cognition. Computational neuroscience has characterized the neurobiological building blocks of brain computation. Artificial intelligence has shown how simple components can be combined to form complex systems that perform feats of intelligence. Modern imaging technologies enable us to measure brain activity at unprecedented spatial and temporal resolution in animals and humans. It is time to assemble the puzzle of brain computation. Here we review recent work at the intersection of cognitive science, computational neuroscience, and artificial intelligence, where computational models that mimic brain information processing during complex perceptual, cognitive, and control tasks are beginning to be developed and tested with brain and behavioral data.

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Keywords

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cognitive science
computational neuroscience

artificial intelligence
cognitive models
neural network models