

R e h a b i l i t a t i o n E n g i n e e r i n g

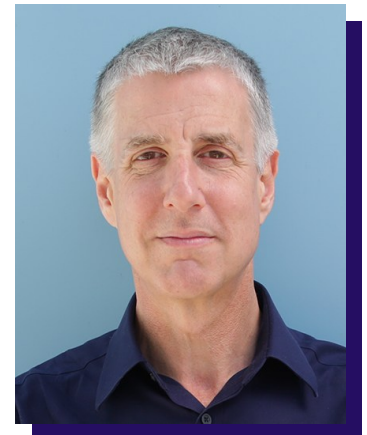
**Computational principles underlying the learning of
sensorimotor repertoires**

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Daniel Wolpert read medicine at Cambridge before completing an Oxford Physiology DPhil and a postdoctoral fellowship at MIT. He joined the faculty at the Institute of Neurology, UCL in 1995 and moved to Cambridge University in 2005 where he was Professor of Engineering and a Royal Society Research Professor. In 2012 he was elected a Fellow of the Royal Society (FRS) and made a Wellcome Trust Senior Investigator. In 2018 he joined the Zuckerman Mind Brain Behavior Institute at Columbia University as Professor of Neuroscience. His research interests are computational and experimental approaches to human movement (www.wolpertlab.com).

ABSTRACT

Motor learning depends critically on context, yet existing theories provide no general framework for how context governs learning and memory. I will present a principled theory showing that memory creation, updating, and expression are all controlled by a single computation: contextual inference. Unlike traditional single-context models, our repertoire-learning framework explains a wide range of motor-learning phenomena within a unified account and predicts novel effects that we confirmed experimentally. These results suggest that contextual inference is a fundamental principle by which the motor system acquires, stores, and flexibly expresses multiple motor memories.

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Friday, September 25th at 11:15 AM

Presented from: EB3, Room 4142—NCSU

Video conferenced to

MacNider Hall, Room 321 (UNC)