The Computational Neurobiology of Reaching and Pointing: A Foundation for Motor Learning By Reza Shadmehr and Steven P. Wise Cambridge, MA, MIT Press, 2005
544 pp, illustrated, $65.00

In *The Computational Neurobiology of Reaching and Pointing*, a unified and comprehensive synthesis of motor learning and control is presented. A quantitative approach is taken to explain computations which may be used to achieve motor tasks taking into account the constraints and limitations involved when biological systems interact with the physical world. *The Computational Neurobiology of Reaching and Pointing* begins with an introduction to the evolution, anatomy, and physiology of the motor system and highlights the idea that the neural substrate controlling movement necessarily evolved; this places limitations on how motor control and learning could be accomplished.

The view that the brain uses "fixation-centered" (retinotopic) coordinates to localize points in space is supported by the large amount of data which are presented. Neural networks may transform those retinotopic coordinates to other coordinate systems (eg, a system centered about the shoulder) allowing both visual and proprioceptive inputs to be used in planning movements. Movement then may be accomplished by computing the trajectory the end-effector (eg, hand) must take to achieve a target location by generating the appropriate forces to do so. A great strength of *The Computational Neurobiology of Reaching and Pointing* is that the authors cite and present clearly an abundance of experimental data throughout the text supporting each of the major concepts.

The topic is necessarily mathematical and the authors draw on and integrate information from many scientific fields including physics, biology, mathematics, robotics, and computer science. This approach allows an understanding and appreciation of the solution to the movement problem taken by both biological systems and idealized robotic systems and highlights the difference between a designed robotic system and an evolved biological system. Even though the mathematics at times may be challenging for some readers, the authors have successfully presented the material so that a wide range of readers can appreciate and understand the ideas. They include several appendices to allow readers to review aspects of the biology, anatomy, mathematics, physics, and neurophysiology. In addition, they provide clear qualitative descriptions of the mathematical concepts. Finally, for advanced readers, there is a supplemental Web resource where expanded treatment of various topics is presented.

Although the main target audience is students of neuroscience, bioengineering, and robotics, neurologists involved in movement disorders research will find *The Computational Neurobiology of Reaching and Pointing* extremely useful as well. The quantitative understanding of normal motor control is a prerequisite for the quantitative understanding of motor control when things go awry.

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Correction

Pierre Castelnau, Laura Cif, Enza Maria Valente, Nathalie Vayssiere, Simone Hemm, Amandine Gannau, Annalisa DiGiorgia, and Philippe Coubes. Pallidal Stimulation Improves Pantothenate Kinase—Associated Neurodegeneration. Ann Neurol 2005;57:738–741.

Due to an editing error, author affiliation 1 was incorrectly reproduced in the original published article. The correct affiliation is [1]Pediatric Neurology and Institut National de la Sante et de la Recherche Medicale U619, Hopital Gatien de Clocheville, Centre Hospitalo-Universitaire, Tours, France.

