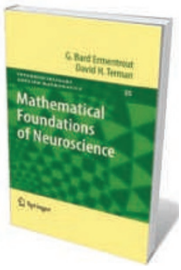
sides of Ermentrout and Terman's research interests are not emphasized in the book, which is directed at a broad interdisciplinary audience.

The traditional material on membrane biophysics, cable theory and neural-spike generation models is presented first. The latter part of the book — covering the nonlinear dynamics of neural interactions — takes a balanced approach, describing models in which the correct timing of individual neural spikes is crucial, and population models based on the firing rates of an ensemble of neurons. Rapidly evolving topics such as neural synchronization and spatially extended models are included.



Mathematical Foundations of Neuroscience
G. BARD ERMENTROUT AND DAVID H. TERMAN
Springer: 2010. 422 pp. $74.95

Ermentrout and Terman go deeper into the mathematics of neural activity than say, Hugh Wilson's 1999 textbook *Spikes, Decisions and Actions* (Oxford University Press). But, unlike Wilson, they pass up most opportunities to connect the mathematics to its cognitive and perceptual consequences.

They emphasize the mathematical basics even over exciting developments in theory. For example, a strong chapter on neural noise neglects stochastic resonance — a phenomenon of nonlinear systems in which a weak signal can be amplified and optimized by noise — and its role in promoting neural pattern formation. Similarly, Terman omits his own model when describing oscillatory neural synchronization, a process that may perceptually bind together the disparate parts of a stimulus.

This tight focus raises the question of how mathematical skills should be taught across science subjects. Should they be conveyed separately to students who show theoretical aptitude, or mixed in as digressions to a science-based lecture series? *Mathematical Foundations of Neuroscience* falls somewhere in between: it is a good substitute for a lengthy regime of abstract maths classes, but it is also well integrated into the field of neuroscience. Ermentrout and Terman's book conveys much of the advanced mathematics used in theoretical neuroscience today. ■

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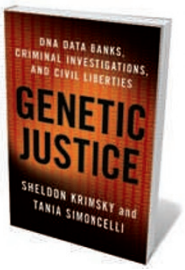
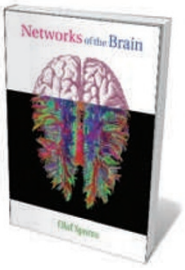
Books in brief

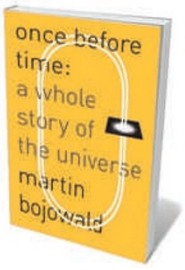


Genetic Justice: DNA Data Banks, Criminal Investigations, and Civil Liberties
Sheldon Krimsky and Tania Simoncelli COLUMBIA UNIVERSITY PRESS *448 pp. $29.95 (2010)*
Governments worldwide are increasingly storing the DNA profiles of their populations. Medical ethics advisers Sheldon Krimsky and Tania Simoncelli describe the US situation, placing those trends in context with precedents in other nations. They examine ethical issues such as holding DNA from juveniles and broadening searches to include a suspect's family members. The fallibility of DNA profiling, they suggest, has major implications for criminal justice.

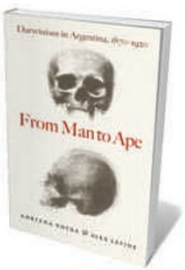


Networks of the Brain
Olaf Sporns THE MIT PRESS *375 pp. $40 (2010)*
The study of brain connectivity increasingly borrows from theories of complex systems. Points of contact between these disciplines are explored in this wide-ranging book by neuroscientist Olaf Sporns. From individual cells and synapses to whole cognitive systems, he explains how networks connect levels of organization in the brain and how their structures link to brain function. As well as documenting the latest developments — using an informal approach that does not rely on mathematics — he traces the historical roots of the field.

The Cuban Cure: Reason and Resistance in Global Science
Simon M. Reid-Henry UNIVERSITY OF CHICAGO PRESS *216 pp. $39 (2010)*
Since Fidel Castro took over the nation in 1959, Cuba has taken science seriously. Its biotechnology programme is especially advanced — it has produced a meningitis B vaccine and cutting-edge cancer therapies despite poverty and a trade embargo. Geographer Simon M. Reid-Henry examines the culture clashes that arise when biomedical scientists from Cuba work on the international stage and compete with big pharma. He asks what lessons Cuba holds for the science bases of other developing countries.



Once Before Time: A Whole Story of the Universe
Martin Bojowald KNOPF *320 pp. $27.95 (2010)*
The origin of the Universe before the Big Bang is difficult to model mathematically. Physicist Martin Bojowald describes his own work to overcome this problem using loop quantum cosmology — a model he developed a decade ago based on the theory of loop quantum gravity, which merges general relativity and quantum mechanics. He explains his search for testable hypotheses. If verified, these might show that the Big Bang was not a one-off event, but one of many recyclings of a Universe that alternately swells and contracts.



From Man to Ape: Darwinism in Argentina, 1870–1920
Adriana Novoa and Alex Levine UNIVERSITY OF CHICAGO PRESS *328 pp. $49 (2010)*
Charles Darwin's ideas about evolution were received differently in Latin America than elsewhere. Focusing on Darwin's use of analogies, science philosophers Adriana Novoa and Alex Levine explore how Argentina's culture influenced interpretations of evolution in the nineteenth century. Darwin's 'tree of life' became a 'tree of death' in the hands of one local scientist. Argentina's diverse peoples and unusual fossils also contributed alternative views of nature.