

## NEURAL COMPUTATION IN ANALOG VLSI

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### ABSTRACT

Neural systems found in the brains of even very simple animals are amazingly effective at performing computations on information arising in the natural world. Neural structures expend less than a millionth of the power required by our most advanced digital signal processing technology for a similar task. At the level of a single device, however, our silicon technology can much more closely approach the energy requirements of structures in the brain. The nervous system achieves its remarkable effectiveness by using the fundamental device physics to define its computational primitives. In addition, algorithmic structures that emphasize spatial locality make best use of limited wiring resources. A deeper understanding of the design approach used by neural systems may make possible a new, and very powerful, engineering discipline.