

Circuit and System Architecture for DNA-Guided Self-Assembly of Nanoelectronics
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Abstract:

This brief presentation describes our long-term goal and progress toward the construction of computing systems through DNA self-assembly of nanoelectronic devices. First, I will describe our recent progress on patterning DNA and outline our plans for constructing circuits. To help guide these efforts, our group is simultaneously exploring the impact of this new technology on computer architecture. The second portion of this talk presents computer architectures that strike a balance between 1) the regularity of large-scale DNA self-assembly patterning capabilities, 2) the complexity required for sophisticated system designs and 3) tolerance to the inevitable defects present in nanoscale systems.

Bio:

Alvin Lebeck is an Associate Professor of Computer Science and of Electrical and Computer Engineering at Duke University. His research interests include architectures for emerging nanotechnologies, high performance microarchitectures, hardware and software techniques for improved memory hierarchy performance, multiprocessor systems, and energy efficient computing. He received the BS in Electrical and Computer Engineering, and the MS and PhD in Computer Science at the University of Wisconsin---Madison. He received the best paper award at the 31st IEEE/ACM International Symposium on Microarchitecture. He is the recipient of a 1997 NSF CAREER Award, has received funding from NSF, DARPA, Intel, Compaq, Microsoft, IBM and is a member of ACM and senior member of IEEE.