

Abstract for an Invited Paper
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DNA Self-assembly and Computer System Fabrication¹

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The migration of circuit fabrication technology from the microscale to the nanoscale has generated a great deal of interest in how the fundamental physical limitations of materials will change the way computer systems are engineered. The changing relationships between performance, defects, and cost have motivated research into so-called disruptive or exotic technologies and draws inspiration from systems found in biology. Advances in DNA self-assembly have demonstrated versatile and programmable methods for the synthesis of complex nanostructures suitable for logic circuitry. Several recent advances in programmable DNA self-assembly and the theory and design of DNA nanostructures for computing will be presented. The advantages of this technology go beyond the simple scaling of device feature sizes (sub-20nm) to enable new modes of computation that are otherwise impractical with conventional technologies. A brief survey of several computer architectures that take advantage of this new technology will also be presented.

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