BMC Bioinformatics

Poster presentation

Open Access

Random number generation for DNA-based security circuitry

Christy M Bogard[1], Eric C Rouchka*[1] and Benjamin Arazi[2]

Address: [1]Department of Computer Engineering and Computer Science, University of Louisville, Louisville, KY 40292, USA and [2]Department of Electrical and Computer Engineering, Ben-Gurion University, Israel

Email: Eric C Rouchka* - eric.rouchka@louisville.edu

* Corresponding author

from UT-ORNL-KBRIN Bioinformatics Summit 2008
Cadiz, KY, USA. 28–30 March 2008

Published: 8 July 2008

BMC Bioinformatics 2008, **9**(Suppl 7):P13 doi:10.1186/1471-2105-9-S7-P13

This abstract is available from: http://www.biomedcentral.com/1471-2105/9/S7/P13

Background

Traditional silicon-based circuits have an inherent issue in that looking at the physical layout of their components can reproduce them. In order to help alleviate this problem, DNA computing, which borrows from the fields of biochemistry and molecular biology, can be used to produce dynamic computing systems. Full-blown DNA computing will require a paradigm shift in circuitry design. As a first step, we present a technique for random number generation incorporating technologies currently in use.

Methods

A DNA-based approach for the equivalent of a digital random number circuitry can be accomplished using a number of techniques borrowed from high throughput sequencing. The proposed novel prototype schema employs solid-phase synthesis of oligonucleotides for random construction of DNA sequences. Temporary storage and retrieval is achieved through the use of plasmid vectors. The resulting DNA sequences can be converted to their digital counterparts using a simple base-4 to base-2 number system conversion.

Acknowledgements

This work was supported in part by NIH-NCRR Grant P20RR16481 and NIH-NIEHS Grant P30ES014443. Its contents are solely the responsibility of the authors and do not represent the official views of NCRR, NIEHS, or NIH.