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CAMBRIDGE SOCIETY FOR THE APPLICATION OF  
RESEARCH

## 'Very rapid genome sequencing'

**Dr Shankar Balasubramanian**

Department of Chemistry, University of Cambridge

Monday, 7<sup>th</sup> June 2004 **7.30 p.m. - 9.00 p.m.**

*The Wolfson Lecture Theatre, Churchill College, Cambridge*

**Chair and Vote of Thanks:** to be confirmed

### About the Lecture:

#### **Shankar Balasubramanian writes:**

The Human Genome Project required a concerted international effort, \$3 billion, and many sequencing machines to sequence most of the 3 million bases of the human genome. The technology used to achieve this was based on the elegant sequencing chemistry invented by Dr Fred Sanger in Cambridge during the 1970s. A future goal is to be able to sequence the genomes of a great many human individuals and other organisms. This would open up many opportunities, which include a detailed understanding of mutations that are associated with diseases, and "personalised medicine".

This requires an improvement of  $10^4$ - $10^6$  in speed, and an equivalent reduction in the cost, of DNA sequencing.

In 1996 in the Department of Chemistry we started to think about alternative chemistries for DNA sequencing combined with the use of single molecule detection and massive parallelisation. We postulated that it was possible to sequence the equivalent of a human genome in a few days for ~ thousand dollars - "*The Thousand Dollar Genome*". Proof of concept experiments, in the University, gave rise to a spinout company, Solexa, that has since developed the technology.

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*Italics denote an affiliation other than the University of Cambridge.*

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In this lecture, I will discuss the science behind this new approach to high-speed gene sequencing.

**About the speaker:**

Shankar Balasubramanian graduated from Cambridge in 1988 with a BA Natural Sciences, and obtained his PhD (Cambridge) in 1991 on the study of enzyme catalysed reaction mechanisms. He then spent two years working with Professor Steven Benkovic, at the Pennsylvania State University, as a NATO Fellow, on the study of enzymatic reverse transcription and mono-oxygenation.

In 1994, he returned to the Department of Chemistry, Cambridge initially as a Royal Society Research Fellow, then University Lecturer (1998) and was made a Reader in Chemical Biology in 2003.

His research interests are all based around the chemical biology of nucleic acids and include the study of telomerase, the DNA quadruple helix and the application of single molecule science.

**The Organising Secretary adds:**

I do remember gene sequencing back in the old days; it took forever, and required extraordinarily expensive machines (which were always American) that filled the room and went by the most unlikely name of 'sequinators'.

I felt they should really be attaching small shiny things to garments.....?

Things have moved on! Come and learn just how far! Check out <http://www.solexa.co.uk> to find out more about the company based on Dr Balasubramanian's work.

This is the last CSAR lecture of the academic year, and one which shows us the shape of things to come!

Best

Richard Freeman  
*CSAR Organising Secretary*