S'porean makes global mark with maths theory.

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Louis Chen is father of the Chen-Stein method which played a crucial rolein the mapping of the human genome

A SINGAPOREAN'S ground-breaking work in **mathematics**, which began more than 30 years ago, is now making its mark on the life-sciences revolution worldwide.

In fact, it played a crucial role in the mapping of the human genome - one of the greatest scientific achievements ever.

Professor Louis Chen is the father of the Chen-Stein method, a technique and theory used widely in the study of molecular biology.

It is a cornerstone of the Blast computer program - the most widely-used program in molecular biology. And it was Blast that was used complete a draft of the human genetic code in 2000.

The University of Southern California's Professor Michael Waterman, a United States National Academy of Sciences member often calle the father of computational biology, said that Prof Chen, together with his Stanford mentor Charles Stein, had started a new line of inq in applied probability and statistics.

'They started something new and it, along with its many children, is very useful in practice. It is truly original and it is deeply important he told The Straits Times.

'In **mathematics** and science, such statements are not made lightly.'

Another leading scientist, Professor Terry Speed of the University of California at Berkeley's statistics department, said that the impact and role of the Chen-Stein method on the human genome project were significant, although indirect.

'It provided valuable theoretical basis for certain computational methods that were widely used throughout the project and beyond,' he said.

'It was important work.'

But when he embarked on his doctoral thesis at Stanford University in 1969, Prof Chen had little inkling of the ripple effect his work wo have.

'In those days, I was dealing with basic **mathematics**. I had no idea of the far-reaching applications that my theory would have years later.'

The name of Prof Chen's theory alone sounds daunting - the 'Chen-Stein method of Poisson approximation'.

Put simply, it deals with the probability that rare events will happen.

And because his method was a different version of Prof Stein's work on normal approximation, it was called the Chen-Stein method.

Prof Chen, director of the **National University of Singapore**'s Institute for Mathematical Sciences, explained that his work has been applied to areas as diverse as computer science, statistical physics and insurance, on top of molecular biology and **mathematics** itself.

An insurance company, for example, could use it to look at how frequently accidents occur and how many claims are made, to calculate the insurance premium it can charge in order to minimise the risk of going bankrupt.

Speaking about the life sciences here, Prof Chen said junior college students should study double maths and biology to best equip themselves for careers in that field.

'The problem now is that most students who do double maths don't do biology, and vice versa. That must be changed.'

To help spur interest at all levels, Prof Chen and the centre's deputy director, Professor Sun Yeneng, have spearheaded a programme to bring experts in both areas together.

Called 'post-genome knowledge discovery', the programme, which runs till June, will bring together biologists, computer scientists, experts in bioinformatics, mathematicians and statisticians with a series of tutorials, workshops, public lectures and lectures to schools

It is not surprising that the 61-year-old Prof Chen has already seen Oscar-nominated film A Beautiful Mind, which is based on the real-l story of maths genius John Nash.

He says that contrary to the schizophrenic Nobel-prize winner of the movie, most mathematicians are normal.

'We're just like anyone else. But we have to be very stubborn and persistent.'

Although conceding that he has dreamt of maths solutions which turned out to be correct on waking up, he said these were only simple ones.

'There are a few problems from my earlier work in probability that I have spent a lifetime trying to solve, but I'm still working on them.

Others took years of work and thought to conquer.

For example, he took 25 years to perfect a technique relating to probability, which was completed in 2000.

'When you finally have a breakthrough, there's elation and euphoria. It's not like falling in love, it's unique.

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