

# Human-like robots that stretch your imagination

S'pore scientists use elastic polymer to create less jerky movements

By DAVID EE

GOODBYE, R2-D2. Hello, Terminator.

Singaporean researchers have made an important breakthrough in the field of robotics that may mean the end of clunky, awkward robots, and herald the rise of a new generation that move like us.

In a world first, they took inspiration from the human body to use conductive, elastic polymers as "muscles".

These stretch in response to electrical impulses, much like human muscles extend and flex when neurons carry signals from the brain.

Robots using the man-made muscles "will be able to function in a more human-like manner" than conventional ones powered

by hydraulics, said lead researcher Adrian Koh of the National University of Singapore's Department of Civil and Environmental Engineering.

They could be up to 10 times lighter. And, crucially, they may be able to carry loads up to 80 times their weight, compared to just double their weight now.

This is because the polymer "muscles" have both strength and high elasticity, meaning they can stretch up to 10 times their length when under strain, before returning to their original shape.

"Think of how efficient cranes could get if armed with such 'muscles'," said Dr Koh.

The 38-year-old was awarded the Promising International Researcher Award at the 3rd International Conference on Electromechanically Active Polymer Transducers and Artificial Muscles in Zurich in June in recognition of his work.



Dr Koh showing how much the translucent polymer is able to stretch. His team aims to create a robot "arm" in three years. ST PHOTO: DESMOND FOO

"Robots move in a jerky manner because of (hydraulics)," he said.

"Now, imagine artificial muscles which are pliable, extendable and react in a fraction of a second just like those of a human."

The polymer, known as acrylic elastomer, has also been used in robot "faces" to enable them to mimic facial expressions.

Extending this throughout a robot body could make it "entirely possible" to one day create robots that are indistinguishable from humans in how they look and move, said Dr Koh.

One other advantage of the polymer is its ability to store energy. This means that robots using it could be predominantly self-powered, needing only short periods of charging.

Dr Koh's team aims to first create a robot "arm" within three years, then a full robot body within six to eight years.

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The tenancy for the leisure hub, built as a buffer between a foreign dormitory and residents, will expire next July. PHOTO: LIM YAOHUI FOR THE STRAITS TIMES

## Uncertain future for lifestyle hub at Serangoon Gardens

By JESSICA LIM  
CONSUMER CORRESPONDENT

BARELY two years after it was opened for business, the future of a popular leisure hub in Serangoon Gardens is now in the balance.

Built as a buffer between a foreign dormitory and residential homes in Serangoon Gardens, the tenancy for Lifestyle Hub @ Burghley - which sits on state-owned land - will expire in July next year.

This means the centre's nine sub-tenants - which include cafes, activity centres for children and art workshops - may have to move out in less than a year.

They are now appealing for the lease to be extended, citing huge difficulties which delayed the centre's opening. These included electricity brown-outs, an inadequate sewerage system, leaky roofs and even termites.

"It was like a desert back then, there was no one here," said Mr William Lee, 41, the owner of My Art Studio.

Mr Lee sunk in \$35,000 to renovate his studio and was the first tenant to move in back in November 2010. "Slowly, we built up our customer base. It would be a pity to lose them," he said.

All the sub-tenants have appealed to Hean Nerng Facilities Management, the 6,880 sq m site's master tenant, for an extension.

In turn, the company wrote to the Singapore Land Authority (SLA) on Thursday and is awaiting a response.

Apart from the infrastructure issues, there were other problems plaguing the centre at first. "It was difficult to attract tenants and customers initially as

we were sited next to the workers' dormitory which the residents had major concerns over," Mr Kelvin Lim, the managing director of LHN Group, Hean Nerng's parent company.

Hean Nerng won the tender for the site in 2010, but full tenancy was achieved only in June last year.

His company pumped in \$1 million to redevelop the site, which is 15m away from the dormitory, from which it is separated by a 2m-high fence.

The site was carved out after more than 1,400 residents petitioned against building the dormitory there in 2008.

Mr Lim said his firm has not yet decided to re-submit a bid if the site is put up for tender again. There is also the possibility that the Government will redevelop the plot.

Mr Thuraijasingam Vijeyasingam, 31, who owns Sky Fitness, is worried rent will go up should the site change hands.

"We are just a small business. If a new fellow comes in, they will want to make money and won't hold the same rental," he said, adding that his yoga centre and gym has 200 members now.

When contacted, a spokesman for SLA said open tenders enable interested parties to have an equal opportunity to bid.

"Should the site be available for further interim use, we will put it up for tender," she said.

The centre's uncertain future has been greeted with dismay by customers like Mr John Dasson, 28, a wealth manager who is a member of Sky Fitness.

"The location is perfect, it is so close to home," he said. "It's like an exclusive oasis. I don't want it to change."

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## 800 DOING THE LOGO-MOTION

This one may be a bit hard to read, but when it comes to logos, it seems size matters.

About 800 people came together in Bishan-Ang Mo Kio Park yesterday to create Singapore's largest human formation of a corporate logo.

In case you were wondering, the 40m-long message says SNCF, or the Singapore National Co-operative Federation.

PHOTO: LIM YAOHUI FOR THE STRAITS TIMES



## Japan's ex-DPM on visit as LKY Exchange Fellow

FORMER Japanese deputy prime minister Katsuya Okada began a five-day visit to Singapore yesterday as the 39th Lee Kuan Yew Exchange Fellow.

During his visit, he will call on Prime Minister Lee Hsien Loong, Emeritus Senior Minister Goh Chok Tong and Foreign Minister K. Shanmugam.

Second Foreign Minister Grace

Fu will host a meal for Mr Okada, who is accompanied by his wife.

The Lee Kuan Yew Exchange Fellowship (LKYE) programme, which began in 1991, invites outstanding individuals here for high-level exchange visits.

Fellows are selected based on their "proven track records or extraordinary potential to contribute to the development of their na-

tions as well as promote international understanding and goodwill", said a statement from the Foreign Affairs Ministry.

Recent fellows include Dr Peter Orszag, vice-chairman of corporate and investment banking at Citigroup, and New Zealand's Minister of Consumer Affairs, Mr Simon Bridges.

Mr Okada is a member of Ja-

pan's House of Representatives. Last year, he served as deputy premier and minister for administrative reform. He was Japan's foreign minister from 2009 to 2010.

He will visit the Urban Redevelopment Authority, Biopolis and the Marina Bay Financial Centre. A welcome dinner will be hosted by LKYE chairman Eddie Teo.

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