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Professor Chen Guanrong, Chair Professor of Electronic Engineering at City University of Hong Kong (CityU), was conferred a second-class award under the State Natural Science Award (SNSA) in recognition of his achievements and contributions in the field of chaos theory.

Professor Chen has been engaged in the research of chaos theory for the past 20 years and is renowned for his discovery of the "Chen System" – a reputed chaos system well known to the international academic community. He is also active in promoting related research among scientists and researchers both at home and abroad.

The SNSA, China's most prestigious award in the field of natural science, recognises academic excellence in basic and applied research in the nation. More than 160 shortlisted projects competed for the award in 2008 and no first-class award was given this year.

Chaos theory seeks to uncover underlying order within apparently disordered

dynamics and data. It is a relatively new discipline, in existence for 40 years or so, but is fast gaining recognition of significance and importance in academic communities. Many scientists rank chaos theory with relativity and quantum mechanics as among the three most important scientific theories of the 20th century.

The award-winning project led by Professor Chen, "Chaos Anti-control and Generalised Lorenz Systems Family - Theory and Applications", belongs to the frontier

Leading CityU scientist receives natural science's highest state award

of interdisciplinary scientific research on chaos theory, control systems and mathematical sciences. Its findings provide some new theories and technologies for the application of chaos theory in engineering, physics and biology alike, for example in network security. Based on chaos theory, Professor Chen has developed a methodology for designing secure communication systems. Under his framework, information is transmitted in a chaotic form, thus ensuring the security of data. What's more, the technology is easy to apply, faster and cost-effective.

The chaotic system founded by Professor Chen in 1999 enjoyed great popularity in the international scholarly world and was named the "Chen System" by fellow researchers. There were several thousand citations on the system, and more than 100 research papers have the name "Chen System" in their article titles.

Professor Chen's main research pursuit is in one of the focusing areas of engineering. While enhancing the quality of basic research, he also applies his research to related areas such as complex networks, information encryption and secure communications, nonlinear vibration analysis and control. He has also introduced this frontier scientific subject to mainland China and initiated related research conducted by many younger scientists.

Professor Chen was pleased to receive the award and regarded this as the nation's affirmation of his achievements in scientific research, and expressed his gratitude to CityU for its strong support over the years. He was particularly gratified his success spurred an impetus to the development of this discipline in mainland China.

"The fact we achieved such great scientific results under not so well-prepared conditions will serve as an impetus to students and young researchers. I hope we'll be able to make greater contributions to our country in this respect," Professor Chen said.

He added there is great potential in further developing the chaos theory, given that it spans many disciplines, including mathematics, physics, engineering, technology, biology, chemistry and even social sciences. Right now some scientists are doing research on how to use chaos theory to explain the processes behind human thought, memory and other cognitive behaviours.

Faculty Honours

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城大科學家獲國家頒授 規格最高科研獎項

(於2009年1月21日刊登)

香港城市大學(城大)電子工程講座教授 陳關榮教授20年來致力於混沌學研究,由 其創立的「陳氏混沌系統」理論得到國際 學術界公認,並大大推動了國內外許多科 研人員從事相關研究,最近獲頒授2008年 度「國家自然科學獎」二等獎。

「國家自然科學獎」是國家在自然科學領 域中規格最高的科研獎項,旨在獎勵在自 然科學基礎研究或應用基礎研究方面取得 的優秀成果。在2008年,共有超過160個 候選項目競逐這一類別的獎項,本年度沒 有頒發一等獎。

混沌學主要研究在雜亂無章的形態資料中 尋找潛在的規律。這是一門較新的科學, 只有四十多年歷史,但日漸受學術界重 視,許多科學家更將之與相對論和量子力 學並列為20世紀三大理論。

由陳教授領導的「混沌反控制與廣義 Lorenz系統族的理論及其應用」得獎研究 項目屬於混沌學、控制論與應用數學的交 叉學科,是非線性科學的前沿課題,並為 混沌科學在工程、物理、生物等領域的應 用提供新的理論和技術基礎,包括備受關 注的網絡安全議題。陳教授以混沌原理研 發的保密通訊系統,使訊息以混沌狀態傳 輸,有效保障資訊安全,而且技術簡單快 捷,成本亦較低。

陳教授1999年發現的混沌系統在國際學術 界享有盛名,被學術界同行命名為「陳氏 混沌系統」,論文中被引用多達幾千次, 以該系統為題的研究論文亦有百多篇。

陳教授專注的研究領域是工程科學中一個 核心範疇。他在不斷提升基礎研究水平的 同時,積極推動混沌學在複雜網絡、保密 通訊、非線性振動等範疇的應用研究,並 把這門前沿科學引進內地,帶動了一大批 較年青的科研人員進行相關研究。

陳教授對榮獲「國家自然科學獎」感到高 興,認為是國家對他的科研成果的肯定, 並感謝城大對他多年來的支持。他亦對能 夠帶動內地科研人員發展這門科學表示欣 慰。

「我們在條件不算太理想的情況下仍能取 得如此可喜的研究成果,對學生和年青研 究人員無疑是一種鼓舞,期望將來可以在 這方面繼續為國家多作貢獻,」陳教授 說。

陳教授表示,混沌學跨越不同學科,包括 數學、物理、工程、技術、生物、化學以 至社會科學等,有很大發展潛力,現在已 有科研人員研究如何利用混沌學解釋人的 大腦思維、記憶、認知等行為。

Media coverage 媒體報導:

Newspapers 報章

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1-2009	Hong Kong Commercial Daily《香 港商報》, Hong Kong Economic Times《經濟日報》, Macao Daily News《澳門日報》, Science and Technology Daily《科技日報》, Sing Tao Daily《星島日報》, Ta Kung Pao《大公報》, Wen Wei Po《文匯報》
1-2009	Ta Kuna Pao《大公報》

Website 網頁

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