

# CAIRS

## NEWSLETTER

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# Message from Head of Research Projects, Professor Michael G. Pecht

## 研究項目總負責人, Michael G. Pecht教授, 給大家的消息

The CALCE team at the University of Maryland and the Hong Kong Polytechnic University (PolyU) team in Hong Kong have put together the program called CAiRS. The purpose was to address those issues that the industry is facing in the areas of reliability and safety. Our key objective is to use modern techniques and reliability and the use of artificial intelligence to solve some of these problems. We believe that we can incorporate these techniques in the design, in the supply chain management and in ongoing operation. When we understand the health of the systems and we improve the safety then we ensure that there's no catastrophic problems.

One of the approaches in our work is to introduce sensors into systems so we can monitor the health of the systems as they are being used in their various applications. It is like putting a doctor on the shoulder of the system. So, the doctor, which is our algorithms, can monitor the system and determine whether it is being used in a healthy manner and if there is any problem with the system. We can forecast the problems. We can also forecast maintenance if it is necessary or replacements, and we can ensure the safety throughout the life cycle.

One of our key objectives is to help industry be able to qualify their products faster. In today's world, people want products to last for several years, in some cases as many as ten years with electric vehicles. In such circumstance, the qualification process is really critical, and we would like to reduce that time from one year that industry often uses today to maybe a month or a few months at the most.

This is a unique program because we have researchers in the United States, and we have researchers in Hong Kong who are collaborating in a continuous manner. So far, we have had many visits by both parties to our respective areas. But ultimately, our goal is to help the industry, so their reliability engineers and their safety engineers can properly do their job.

產品可靠性暨系統安全研發中心 (CAiRS) 由香港理工大學夥拍美國馬利蘭大學CALCE團隊 (University of Maryland, USA) 合作成立。目的是解決業界在產品可靠性和系統安全方面所面對的問題。我們主要利用先進技術和運用人工智能來進行各項產品可靠性和系統安全研究。我們相信將這些技術融入設計、供應鏈管理和持續運作中，從而了解產品或系統的健康狀況，提高產品可靠性和系統安全，務求準確預測故障發生，防患於未然。

我們研究的其中一種方向是將傳感器引入系統，這樣當它配置於各種不同的應用時，我們就可以監控系統的健康狀況。就像把醫生放置在系統的肩膀上。所謂醫生，也就是我們的算法，可以監控系統並確定它是否以適當的方式使用，以及系統是否存在任何問題，繼而預測故障。如果有需要，我們可以預測維護或進行更換，從而確保整個生命週期的安全。

我們的重點目標之一是協助業界能夠更快速地驗證其產品。在現今社會，我們期望產品可以長久地使用，例如電動汽車使用期甚至可以長達十年。認證過程非常關鍵，同時我們亦希望將有關認證所需的時間縮短，由現時業界經常所需的一年時間縮減至一個月或至多數個月。

這個項目非常獨特，我們在美國有研究人員，同時在香港亦有研究人員，以持續的方式進行科研合作。迄今為止，雙方已多次在各自的領域進行交流。而最終，我們的目標是幫助業界，讓他們的可靠性工程師和安全工程師能夠正確地完成工作。

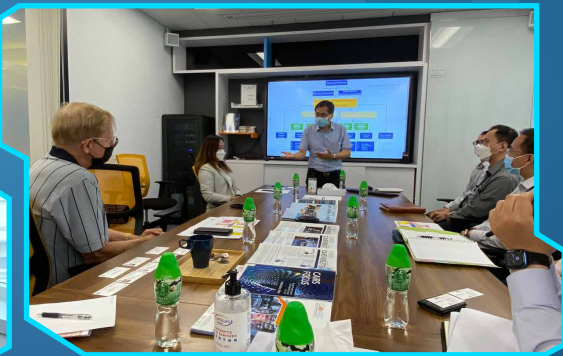


# Professor Michael G. Pecht Visit to CAiRS & PolyU

## Pecht教授到訪CAiRS及香港理工大學

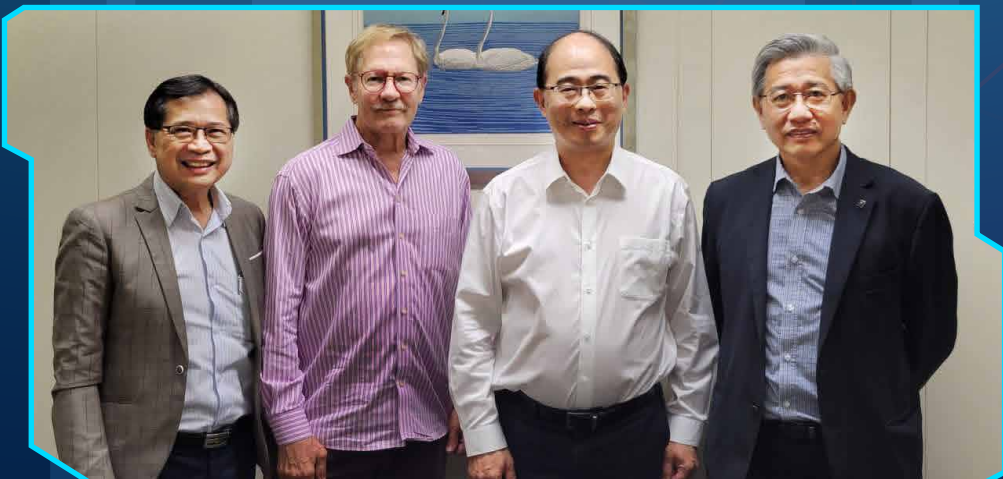
Prof. Pecht came to Hong Kong in November & December 2022. He visited CAiRS and PolyU, exchanged insights with Ir Prof. Winco Yung and his team on the research projects of the Centre. At the same time, Prof. Pecht seized the opportunity to have more communication with PolyU senior management. In addition, Prof. Pecht was invited as one of the featured speakers in the public seminar held by CAiRS to share his research cases with the industry. Although Prof. Pecht's schedule is very tight, he also visited HKEIA and several CAiRS industrial collaborators to gain a better understanding of the industry's research needs on product reliability and system safety.

Pecht教授於2022年11月和12月來港，到訪了CAiRS及香港理工大學，與容錦泉教授及其研究團隊就中心的研究項目與Pecht教授進行了深層次的討論。同時，Pecht教授亦把握機會與香港理工大學的高層領導有更多的溝通交流。另外，Pecht教授獲邀為CAiRS所舉辦的公開研討會作為主講嘉賓之一，與業界分享他的研究案例。雖然Pecht教授的行程非常緊湊，他亦馬不停蹄到訪了香港電子業商會及多家CAiRS的工業合作夥伴，加深了解業界對產品可靠性及系統安全方面的研究需要。



Ir Prof. Winco Yung, Executive Director and Centre Director of CAiRS and teams had in-depth discussions with Prof. Michael G. Pecht, Head of Research Projects, on research projects during his visit to CAiRS.

CAiRS總監及執行董事 容錦泉教授，及其研究團隊就中心的研究項目與CAiRS研究項目總負責人 Michael G. Pecht教授進行了深入討論及意見交流。



(From left) Ir Prof. Winco Yung, Prof. Michael G. Pecht, Prof. Wing-tak Wong, Deputy President and Provost of PolyU, and Ir Prof. H.C Man, Dean of Engineering Faculty of PolyU

(左起) 容錦泉教授、Michael G. Pecht教授、香港理工大學常務及學務副校長黃永德教授及香港理工大學工程學院院長 文効忠教授



Prof. Pecht had fruitful discussions with CAiRS Project Leaders and their team of researchers.  
Pecht 教授與 CAiRS 項目負責人及其研究團隊進行了滿有成效的交流討論。



# Prof. Pecht and CAiRS team Visited several CAiRS's Industrial Collaborators

## Pecht 教授到訪多家CAiRS的業界合作夥伴



GP Batteries International Limited  
(金山電池國際有限公司)



Meridian Innovation Limited



Hong Kong Electric Company Limited  
(香港電燈有限公司)



Yau Lee Construction Co. Limited  
(有利建築有限公司)



Lunch meeting with MTR  
(與港鐵的午餐聚會)



Prof. Pecht visited The Hong Kong Electronic Industries Association (HKEIA)  
Pecht 教授到訪香港電子業商會 (HKEIA)

## Activities Highlight 活動花絮

### PolyU Executive VP Visit to CAiRS 香港理工大學行政副校長到訪

The Executive Vice President of The Hong Kong Polytechnic University, Dr. Miranda Lou visited CAiRS on 10 November 2022 and our recent research works were introduced to her at the visit.

香港理工大學行政副校長盧麗華博士於 2022 年 11 月 10 日到訪了 CAiRS，我們的團隊向她介紹本中心的研究項目。



### Official Launch of Microelectronics Technology Consortium (METC) 微電子技術聯盟 (METC)正式成立



CAiRS attended the launching ceremony of the Microelectronics Technology Consortium (METC) on 9 November 2022. CAiRS is one of the members of METC which is an ASTRI-initiated industry consortium (the ASC), since February 2021.

我們參加了 2022 年 11 月 9 日 METC 的啟動儀式。CAiRS 是 METC 的成員之一，而 METC 是應科院於 2021 年 2 月發起的行業聯盟 (ASC)。



# CAiRS Public Seminar

## CAiRS為業界舉辦研討會

CAiRS public seminar titled "Challenges in Product Reliability & System Safety" was successfully held on 3 November 2022. In this seminar, we were honored to have two featured speakers who are world-renowned experts in Product Reliability & System Safety. Case studies in bare PCB and Li-ion batteries were presented and discussed.

由產品可靠性暨系統安全研發中心為業界舉辦的研討會『產品可靠性與系統安全的挑戰』於2022年11月3日已完滿結束。我們很榮幸邀請到兩位在產品可靠性與系統安全領域享譽全球的專家作為主講嘉賓，分享和討論有關裸印刷電路板和鋰離子電池的案例研究。



Featured speakers (Prof. Michael G. Pecht & Prof. Kenneth K.M. Lam) posed a group photo with Ir Prof. Winco Yung at the seminar

講者們 (Prof. Pecht及林健文教授) 與容教授在研討會上合照留念



Over 100 guests from the industries joined the seminar

有超過100名來自業界的嘉賓參與是次研討會

# PolyU Career Fair 2022

## 2022香港理工大學招聘會

CAiRS participated in career fair organized by PolyU on 1 November 2022 to source for talents in AI, electronic and electrical engineering.

CAiRS於2022年11月1日參加由香港理工大學舉辦的招聘會，以物色人工智能、電子及電機工程領域的人才



# Collaborator Visits to CAiRS

## 合作夥伴到訪CAiRS

Several CAiRS industrial collaborators visited CAiRS in the past few months. We exchanged insights in the areas of product reliability and system safety and had discussions on collaboration opportunities.

多家 CAiRS 的合作夥伴在過去數月到訪了 CAiRS。我們就產品可靠性和系統安全領域上交流，並討論了協作的機會。



Compass Technology Co Ltd  
(5 Oct 2022)

金柏科技有限公司  
(2022年10月5日)



Yau Lee Construction  
(24 Oct 2022)

有利建築有限公司  
(2022年10月24日)

# NVIDIA User Group Meeting

## NVIDIA 用戶群組聚會

NVIDIA, CAiRS technical collaborator, organized an NVIDIA DGX User Group Gathering on 7 October 2022. They shared the latest technology advancement of their supercomputer offerings and user sharing with other DGX supercomputer users in Hong Kong.

CAiRS 技術合作夥伴 NVIDIA 於 2022 年 10 月 7 日舉辦了 NVIDIA DGX 用戶群組聚會。他們與香港其他 DGX 超級電腦的用戶分享了他們超級電腦產品的最新技術進展。





# CAiRS Career Day

## CAiRS 職業資訊日

PhD students from PolyU visited CAiRS on 15 December 2022. We had a wonderful sharing about product reliability & system safety challenge. We also talked about useful AI methodologies, and research opportunities.

香港理工大學的博士生於2022年12月15日到訪了CAiRS，我們就產品可靠性和系統安全、人工智能技術和其他技能進行了愉快的分享。



# Hon. Duncan Chiu Visit to CAiRS

## 邱達根議員到訪CAiRS

Hon. Duncan Chiu, a member of the Hong Kong Legislative Council for the Technology and Innovation functional constituency visited CAiRS on 20 September 2022. Introduced to him were CAiRS research objectives and our goal to contribute to Hong Kong becoming a sustainable Smart City.

香港特別行政區科技創新界立法會議員邱達根先生於2022年9月20日到訪CAiRS。向他介紹本中心的研究目標，為香港成為可持續發展的智慧城市作出貢獻。





# World Artificial Intelligence Conference (WAIC)

## 2022世界人工智能大會 (WAIC)

CAiRS exhibited in the recent World Artificial Intelligence Conference 2022 – Hong Kong Branch on 1 September 2022. The event took place simultaneously with the annual WAIC event in Shanghai, where the world's leading AI summit originated. This year's WAIC carried the theme of "Intelligent Connectivity" and "Infinite Multiverse".

CAiRS 於 2022 年 9 月 1 日參加了 2022 年世界人工智能大會——香港分會。該活動與上海一年一度舉辦的 WAIC 活動同時舉行，為世界領先的人工智能峰會發源地。本屆WAIC以「智聯世界 元生無界」為主題。



## News Update

### 最新消息

#### **Maryland Engineering ranks #11 among public colleges in the U.S.**

CAiRS partner, the University of Maryland's A. James Clark School of Engineering was ranked #11 among the country's public universities in U.S. News & World Report 2022-23 Best Colleges Rankings, rising one spot from #12 in 2022.

馬里蘭工程學院在美國公立大學中排名第 11 位

CAiRS 的合作夥伴馬里蘭大學 A. James Clark 工程學院在《美國新聞與世界報導》2022-23 年最佳大學排名中在美國公立大學中排名第 11 位，比 2022 年的第 12 位上升了一位。



**A. JAMES CLARK**  
SCHOOL OF ENGINEERING

**CALCE** | CENTER FOR ADVANCED LIFE CYCLE  
ENGINEERING