



# 正負2度C × ART 的負經濟效應

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NEGATIVE ECONOMIC  
IMPACTS OF  $\pm 2^{\circ}\text{C}$  × ART

極端氣候對藝術產業的  
影響與因應對策

STRATEGIES FOR ART INDUSTRY  
FACING CLIMATE EXTREMES

**2014 ART TAIPEI FORUM**  
**臺北藝術論壇**

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近十年天氣災害所造成之損害屢破記錄，例如：2007年夏天英國大洪水造成80億美元經濟損失損失為英國史上最大之水災；2005年美國卡崔納颶風造成超過1000人死亡與1,250億美元的經濟損失，為人類有史以來經濟損失最大之天氣災害；2010年末與2011年初澳洲世紀大洪水造成重大損失；2012年年底，珊迪颶風重創了美國雀兒喜畫廊區(Chelsea galleries)，造成整體藝術產業虧損高達五十億美元等。聯合國已發表聲明，認為在未來無法預知的極端天氣下，災害損失將成為「新的常態」(new normal)。原本就瞬息萬變、難以預測的藝術市場，加上氣候變遷所帶來的衝擊，對藝術產業的發展無疑是一種巨大挑戰。

就藝術產業而言，全球氣候的變異將對藝術產業造成二大面向的影響：第一為極端天氣事件對藝術品造成直接致命性的破壞；第二為氣候變異造成藝術品保存維護的難度或成本增加，如溫度、濕度的變化。事實上，這些影響所擴及的範圍並不只限於美術館、畫廊等機構，對藏家或是藝術創作者而言，災害風險管理的觀念更是不容小覷。今年臺北藝術論壇所規劃的「±2° C X ART的負經濟效應：極端氣候對藝術產業的影響與因應對策」專題，透過防災措施、風險管理、緊急處置三個災害應變程序，期待建立從個人到機構對災害風險的應有觀念。

而今年的閉幕場次「亞洲價值」，特別邀請了北京畫廊協會會長程昕東、韓國畫廊協會會長表美仙，透過各具代表性的畫廊協會，從不同文化脈絡的發展及經驗中，探討亞洲藝術市場中的競合關係。在國際化的浪潮之

下，藝術產業的國際化及當地產業發展有可能會產生矛盾或牽制。而事實上，在國際化的過程中，是更有機會地擴增在地藝術發展的條件。近年來全球藝術市場持續聚焦亞洲，在亞洲多元豐富的文化底蘊下，期待透過這樣的交流，從中發現亞洲藝術未來的挑戰與機會，並締造更豐富的亞洲價值。

臺北藝術論壇至今已邁入第九個年頭，今年規劃的「±2° C X ART的負經濟效應」與「產業趨勢觀察與報告」兩大主軸，從產業鏈的角度深化議題探討層面，跨領域的思考產業發展現象，竭誠邀請您一同與我們探討極端氣候的負經濟效應、創造亞洲藝術經濟力。

張逸群

社團法人中華民國畫廊協會理事長

Intermittent disasters brought on by erratic weather have been a hot global issue for the past decade. The United Nations released a statement saying that there is no way to predict extreme weather conditions and that disaster losses will become the new normal. Here are some examples of such losses. The biggest flood in the history of the United Kingdom took place during the summer of 2007 and caused \$8 billion worth of damages. In 2005, Hurricane Katrina caused 1000 deaths and \$125 billion worth of damages, becoming the largest amount of economic damages caused by a weather disaster in history. Record breaking floods in Australia at the end of 2010 and beginning of 2011 also lead to great losses. The art industry encompasses a broad spectrum of cultural heritage, but is utterly under prepared in the face of disaster. One of the most shocking examples was Hurricane Sandy, which struck towards the end of 2012. Sandy devastated the Chelsea galleries in New York and caused approximately \$5 billion in damages. The art market is already ever-changing and unpredictable. Coupled with the impact of climate change, the development of the art industry, undoubtedly, faces great challenges.

Impact on the art industry from climate change is twofold. First, disasters such as floods may damage artwork beyond repair. Second, changes in the climate, such as temperature and humidity, may increase difficulties or cost of storing and preserving artwork. In fact, this impact is not limited to museums, galleries, or like institutions. For a collector or artist, disaster risk management cannot be ignored. "Negative Economic Impacts of  $\pm 2^{\circ}$  C X ART: Strategies for Art Industry Facing Climate Extremes," organized by this year's Art Taipei Forum, provides a platform for discussion and communication for participants and scholars. This workshop aims to explore disaster prevention, risk management, and emergency response and hopes to establish the appropriate response concepts on an individual and institutional level.

The closing ceremony, Asian Value, will feature, the president of the Art Gallery Association in Beijing, Xin Dong Cheng and, the president of Galleries Association of Korea, Mi-Sun PYO. Drawing from the development of different cultural contexts and experiences from their representational associations, they aim to examine the competition and cooperation relationships in the Asian art market. In the face of globalization, it is inevitable that Asia will have to address the provocation and impact brought on by Western modernization. In fact, the many cultural contradictions and restraints between the West and the East are conducive to diverse development and opportunities. They also broaden conditions for local art development. For the past few years, the global art market has concentrated its focus on Asia. Through this exchange, we hope to discover future challenges and opportunities for Asian art and, in turn, create an even richer Asian Value.

Branching from the main theme of "Asian Value, two workshops are planned: "Negative Economic Impacts of  $\pm 2^{\circ}$  C X ART" and "Industry Trends and Observations." In its ninth year, the Art Taipei Forum is one of the few international art forums within Taiwan that combine academia and the market. It is one of the biggest events of the year for the art world. Industry reps and experts from both home and abroad will gather to discuss the negative economic impact caused by the industry and environment with a multi-disciplinary approach and an industry chain perspective. You are sincerely invited to partake in discussion on global art issues and to help create economic power of Asian art.

*Oliver Chang*

Chairman of Taiwan Art Gallery Association

## 論壇介紹

「台北藝術博覽會」每年於展覽期間舉辦專業的產業論壇－「台北藝術論壇」，是國內少數兼顧學術與市場的國際型藝術研討會，匯聚國內外精英與產業代表，系統性地討論亞洲豐富精采、異質多元的文化藝術，以及跨市場、區域的實務觀點和學術理論。今年邁入第九屆的台北藝術論壇將聚焦討論藝術市場的「負經濟學」議題，這也是全球藝術圈首次有系統、且正面的討論這個對日後全球藝術市場將有重大影響的新課題。

## 主要議題

### ±2° CXART 的負經濟效應

近年來因全球氣候異常，極端天氣型態發生頻率增加，對經濟活動造成的損失也持續擴大。其中，就藝術產業而言，造成展覽活動的中斷、藝術品的損害、保存環境的變異……等等直接和間接的損失都非常可觀。以 2012 年 11 月中，珊迪颶風重創美國紐約的雀兒喜畫廊區 (Chelsea galleries) 為例，損失即高達五十億美元以上。

台灣同樣位於高風險的地區，可是不論政府或民間對於災害風險管理及應變措施的重要性，卻相當輕忽且毫不重視。有鑒於此，台北藝術論壇特別於論壇首日規劃「±2° C X ART 的負經濟效應：氣候異常對藝術產業的影響與因應對策」專題，內容涵蓋：防災措施、風險管理、緊急處置等三個程序，從案例和研究成果中，提供政府和民間建立應有的觀念和防災體系。

### 產業趨勢觀察與報告

近年來，國際企業界對藝術的收藏與贊助已蔚為一股風潮，無論是單純地提供金錢贊助、藉由獎項或駐村提供創作及展覽資源，或是在全球藝術市場進行策略性的藝術品購藏佈局，藉由「藝術倡議 (Art-Based Initiatives)」的實踐，企業在提升品牌形象與營運績效的同時，也為藝術從業者帶來實質的助益，成功創造互惠的雙贏模式。

喬凡尼 史基馬 (Giovanni Schiuma) 博士身兼倫敦藝術大學藝術管理教授與創新思考力中心執行長，他以藝術中的商業與策略知識管理專家載譽全球，與其廣泛的管理專業與整合研究團隊與企畫案的優異能力，他指出，藝術是一項強而有力的工具，這個工具能讓管理者提升組織的價值創造空間，以及激勵商業表現。在以藝術為主軸的前提下，藝術可以隨著勞動力與公共設施的增加而與時俱進，終將會創造出好的價值。期盼藉由喬凡尼·史基馬博士的經驗交流，在國內激發更多藝企合作的想像，讓台灣企業也能在其中開創出一片兼顧文化與經濟價值的嶄新藍海，進一步探討全球藝術金融化浪潮對視覺藝術產業發展趨勢與影響。

## Introduction

Art Taipei Forum, a specialized industry forum, is held every year during Art Taipei. The forum is one of the few international art forums that combine academia and the market. Local and foreign elites and market representatives converge to systematically discuss the rich, brilliant and diverse nature of Asian culture and art. They will also be examining cross-market and cross-regional perspectives and academic theories. Entering into its ninth year, Art Taipei Forum will also focus on the issue of “negative economics.” This is the first time the international art circle will discuss this new phenomenon that will have a large impact on the international art market in such a systemic and direct manner.

## Themes

### **Negative Economic Impacts of ( $\pm 2^{\circ}$ C) X ART**

Recent increases in climate abnormalities and extreme weather occurrences have inflicted greater losses on economic activities. For the art industry, this may lead to exhibition interruptions, damage to artwork, changes in storage environments, etc. Both direct and indirect losses are rather significant. In November of 2012, Hurricane Sandy battered the Chelsea galleries in New York City, causing damages of more than \$5 billion.

Taiwan is also a high risk region. But the importance of the government or civilian’s disaster risk management and contingency measures are largely ignored. In view of this, Art Taipei Forum has organized a workshop on the first day, titled “Negative Economic Impacts of ( $\pm 2^{\circ}$  C) X ART: Strategies for Art Industry Facing Climate Extremes. The topics include disaster prevention, risk management, and emergency response, will discuss the proper concepts and disaster prevention system that governments and civilians should have.

### **Industry trends and observations**

In recent years, it has become a trend that international corporations collect and sponsor in art, whether it is simply to provide financial sponsorship; through prizes, by providing creative and exhibition resources for art residencies or strategic purchases of art collection from the international art market. By implementing “Art-Based Initiatives (ABIs)”, corporations can enhance their brand image and operation performance and also bring about actual assistance for art practitioners at the same time, successfully creating a mutually beneficial, win-win model.

Dr Giovanni Schiuma is Professor of Arts based Management and Director of the Innovation Insights Hub at University of the Arts London. He is widely recognized as one of the world’s leading experts in the arts in business and strategic knowledge management. Inspiring speaker and facilitator, with extensive research management expertise and excellent ability to coordinate complex projects and lead research teams. Creative and innovative, with international mind-set and openness to address and solve key strategic research and organisational challenges. Professor Giovanni Schiuma claims that the arts represent a powerful means by which management can enhance organisational value creation capacity and boost business performance. In the forms of Arts-Based Initiatives (ABIs), the arts can be employed and deployed for developing workforce and organisational infrastructure that can drive in turn superior value creation. We hope that through this exchange of experience, it would inspire more collaboration between art and businesses in Taiwan, where local corporations tempt to explore a brand-new Blue Ocean Strategy that creates both cultural and economic value. Furthermore, the session also discovers how the wave of financial sectors in global art has affected the development and trends of visual art industry

舉辦地點：信義誠品六樓視聽室

10月31日 (Fri) 2014

11月1日 (Sat) 2014

9:30 報到		
10:00-12:00	<p><b>±2° CXART 的負經濟效應： 極端氣候對藝術產業的影響與因應對策</b></p> <p><b>總體報告與風險管理： 從美國珊迪颶風談起</b></p> <p>孫貴珍 安盛藝術品保險公司亞洲區總經理</p> <p><b>主持人</b> 趙琍 誠品畫廊總監</p>	<p><b>建立藝術與商業交叉創新的橋樑</b></p> <p>喬凡尼 史基馬 倫敦藝術大學藝術管理教授與 創新思考力中心執行長</p>
午餐休息		
13:30-15:00	<p><b>氣候變遷與災害 台灣藝術產業的因應措施與策略</b></p> <p>許文科 國立中央大學災害防治研究中心 副研究員兼任執行秘書</p> <p><b>主持人</b> 石隆盛 台北藝術產經研究室執行長</p>	<p><b>亞洲收藏家</b></p> <p>王薇 龍美術館創辦人</p> <p><b>主持人</b> 陸潔民 中華民國畫廊協會資深顧問</p>
休息		
15:30-17:00	<p><b>緊急處置 受損藝術品的緊急處置與修復要點</b></p> <p>蔡舜任 TSJ 藝術修復工事 主修復師暨負責人</p> <p><b>主持人</b> 謝佩霓 高雄市立美術館館長</p>	<p><b>亞洲價值： 亞洲藝術市場的整合與競爭</b></p> <p>張學孔 中華民國畫廊協會前理事長 程昕東 北京畫廊協會會長 Anna PAPPAS 澳洲商業藝廊協會 理事長</p> <p><b>主持人：</b> 張逸群 中華民國畫廊協會理事長</p>

\*主辦單位保留議程更動的權利

## 講者與主持人

依照出場順序排列

<b>孫貴珍</b>	安盛藝術品保險公司亞洲區總經理
<b>許文科</b>	國立中央大學災害防治研究中心副研究員兼任執行秘書
<b>蔡舜任</b>	TSJ 藝術修復工事主修復師暨負責人
<b>喬凡尼 史基馬</b>	倫敦藝術大學藝術管理教授與創新思考力中心執行長
<b>王薇</b>	龍美術館創辦人
<b>程昕東</b>	北京畫廊協會會長
<b>張學孔</b>	中華民國畫廊協會前理事長
<b>Anna PAPPAS</b>	澳洲商業藝廊協會 理事長

## 主持人

<b>趙琍</b>	誠品畫廊總監
<b>石隆盛</b>	台北藝術產經研究室執行長
<b>謝佩霓</b>	高雄市立美術館館長
<b>陸潔民</b>	中華民國畫廊協會資深顧問
<b>張逸群</b>	中華民國畫廊協會理事長

Venue: Eslite Book Store Xinyi Branch 6F Audio-Visual Room

31 October, 2014 (Fri)		1 November, 2014 (Sat)	
9:30 <b>Registration</b>			
10:00-12:00	<p><b>Negative Economic Impacts of (<math>\pm 2^{\circ}</math> C) X ART : Strategies for Art Industry Facing Climate Extremes</b></p> <p><b>Economic Impacts &amp; Risk Management: A Case Study from Hurricane Sandy</b></p> <p>Jennifer SCALLY Regional Director, AXA ART Asia Limited</p> <p><b>Moderator</b></p> <p>Emily CHAO Director, Eslite Gallery</p>	<p><b>Bridging Arts and Business for Cross-Innovation</b></p> <p>Giovanni SCHIUMA Director, Innovation Insights Hub, Central Saint Martins College of Arts and Design, UAL</p>	
<b>Lunch Break</b>			
13:30-15:00	<p><b>Climate Change &amp; Disaster: Art Industry Action Plan for Prevention/ Recovery</b></p> <p>Wenko HSU Executive Secretary &amp; Associate Research Fellow, Research Center for Hazard Mitigation &amp; Prevention, NCU</p> <p><b>Moderator</b></p> <p>Long-Sheng SHIH Executive Director, Taipei Art Economy Research Centre</p>	<p><b>Asian Collectors</b></p> <p>Wei WANG Founder, Long Museum</p> <p><b>Moderator</b></p> <p>Jimmy LU Consultant, Taiwan Art Gallery Association</p>	
<b>Tea Break</b>			
15:30-17:00	<p><b>Emergency Response: Restoration Guidance for Damaged Artworks</b></p> <p>Shun-Jen TSAI Chief Conservator &amp; Owner, TSJ Art Conservation &amp; Restoration</p> <p><b>Moderator</b></p> <p>Pei-ni Beatrice HSIEH Director, Kaohsiung Museum of Fine Arts</p>	<p><b>Asian Value : The Competition of Art Market in Asia</b></p> <p>Richard CHANG Former Chairman, Taiwan Art Gallery Association</p> <p>Xin-Dong CHENG President, Art Gallery Association, Beijing, China</p> <p>Anna PAPPAS President, Australian Commercial Galleries Association</p> <p><b>Moderator</b></p> <p>Yih-Chyun CHANG Taiwan Art Gallery Association</p>	

**Speaker & Moderator**

依照出場順序排列

<b>Jennifer SCALLY</b>	Regional Director, AXA ART Asia Limited
<b>Wenko HSU</b>	Executive Secretary, Research Center for Hazard Mitigation & Prevention, NCU
<b>Shun-Jen TSAI</b>	Chief Conservator & Owner, TSJ Art Conservation & Restoration
<b>Giovanni SCHIUMA</b>	Director, Innovation Insights Hub, Central Saint Martins College of Arts and Design, UAL
<b>Wei WANG</b>	Founder, Long Museum
<b>Xin-Dong CHENG</b>	President, Art Gallery Association, Beijing, China
<b>Richard CHANG</b>	Former Chairman, Taiwan Art Gallery Association
<b>Anna PAPPAS</b>	President, Australian Commercial Galleries Association

**Moderators**

<b>Emily CHAO</b>	Director, Eslite Gallery
<b>Long-Sheng SHIH</b>	Executive Director, Taipei Art Economy Research Centre
<b>Pei-ni Beatrice HSIEH</b>	Director, Kaohsiung Museum of Fine Arts
<b>Jimmy LU</b>	Consultant, Taiwan Art Gallery Association
<b>Yih-Chyun CHANG</b>	Taiwan Art Gallery Association





# ±2° CXART 的負經濟效應： 極端氣候對藝術產業的影響與 因應對策

總體報告與風險管理：  
從美國珊迪颱風談起

孫貴珍

安盛藝術品保險公司亞洲區總經理

## 珊迪颱風造成藝術品損失

珊迪颱風造成保險業損失預計總共 \$250 億美元，使其成為 2005 年卡特里娜颶風後第二個損失最嚴重的颱風損失。珊迪颱風幾乎令海水淹沒美國整個切西爾藝術區，覆蓋範圍斷電數日，造成搶救工作遲緩。藝術品保險市場的損失估計達 \$6 億美元，其中包括 60 年代平面設計師插畫家彼得 Peter Max 的作品受到嚴重損壞，估計保險索賠約 \$3 億美元，這是藝術品保險目前為止最大的單一保單損失。這次損失約略耗盡藝術品保險業全年的保險費收入，迫使之後數年保險費因而提高。安盛藝術品保險受珊迪颱風的損失估計賠償 \$4,000 萬美元。

我們可以說珊迪颱風是一個天災，也可說是全球暖化一連串影響其中的一個結果。我們今天不談及造成全球暖化的原因，但相信大家已看到過去十年來全球暖化產生的天氣異常現象。

根據 The Intergovernmental Panel on Climate Change (IPCC(2011)) 發現全球暖化產生的天氣異常現象 (一般定義以當地氣象紀錄的 10% 差異) 每年所造成的損失從 1980 年 \$200 億美元到 2010 年的 \$2,000 億美元，其中受卡特里娜颶風導致 2005 年的年度損失最高。根據研究，在過去數年裡與全球氣候有關的災害損失主要反映在財產上的直接損失，且分佈全球。損失估計及影響，從生命的損失，文化遺產到生態系統都受到影響，就 2013 年全球的巨災造成 26,000 人生命的損失及 \$1400 億美元的財務損失。

根據過去 10 年的觀察及統計，全球暖化造成的天

氣異常現象及生態的轉變下，直接氣象變化主要包括以下六種現象：

1. 熱帶風暴 - 從過往十幾年到現在，熱帶風暴的風速愈來愈高，降雨量也逐年增加。在本世紀的過程中，最大風速可能增加 2-11%，而降雨量會增加 3-31%。
2. 更炎熱的夏季 - 各地夏季高溫也會逐年提高，氣候模型表示，如果全球變暖勢頭不減。根據氣象記錄，自史以來平均溫度最高的 5 年產生在 1997 年以後，及最熱的 10 年也發生在 1990 年後，其中最熱的時期為 2005 至 2010 年。科學家預測到 20 世紀底，全球平均氣溫將增加 10° F。
3. 乾旱 - 極度溫差的變化，帶來更多的氣候不穩定性，以致導致更極端更廣泛區域的乾旱期。
4. 森林大火 - 更長的夏季使天氣更加乾燥，並延伸到秋季。乾燥的條件增加火災發生的概率，波及的範圍更廣。再加上閃電雷擊次數增多，預計雷暴變得更加嚴重，使森林大火的情況更難控制。
5. 洪水 - 在過去 100 年海平面逐年升高約 4-8 英吋，科學家預測在今後的 100 年海平面將升高到 36 吋。屆時將造成更多地區被淹沒及洪氾。極度溫差的變化，空氣循環，使夏季降雨增加帶來更加嚴重的洪水氾濫情況增加。全球變暖預計將在未來的歲月裡將帶來更多和更強的降水量。
6. 暴風雪 - 全球變暖帶來更強的降水事件是一個明顯趨勢，夏季有更多降雨量造成洪水，冬季則有



更大更強烈的暴風雪，如歐洲及美國中西部 and 東北地區。

以上這些災害除了對生命、財產造成直接損失，對藝術品的毀損也不例外。過熱可使藝術品材質變形或變色，溫度過低或環境乾旱可造成藝術品變實及裂化，潮濕的環境助長霉菌滋生，火災時使得損失擴大，而其中以火災及水災造成的損失最嚴重，甚至能造成藝術品全損。

### 潛在風險的處理

以上災害雖是無法避免，但却可以透過風險管理的方法預防及減輕損失發生。各別收藏個體或機構甚至美術館、博物館所採取的方法及步驟可能有異，但以下主要範圍是不可忽視的：主要包括：設計和結構在內的物理安全、人工控制安全、電子安全、火災預警及控制、環境控制、存貨清單和資產控制（包括藝術品的懸挂和安裝）、機構政策和規程、管理疏忽和控制。

### 地點

收藏品應避免儲存或擺放在低窪地區，緊鄰具有森林大火威脅區，亦應留意存放點是否位於地震區。

### 建築設計及結構

抑制火災損失的首要條件在建築物的設計和結構，主要的防火考量如下：

1. 加固水泥的防火結構或防護式鋼鐵是承載牆、天花板及屋頂的理想建材。選擇非燃性的建材，但

在祝融肆虐下，結構的攤場是極可能發生的。貴重藝術品的優良置放處，不應選擇在易燃建材所造之建物內。

2. 在可能的範圍內，可以將火勢的影響控制在一定的區域及金額。良好的區隔及空間劃分是將藝術品遠離起火點的好方法。包裝區或修復區應與展場及貯藏區作出適當的區隔。
3. 抑制洪水或暴雨所導致的損失，亦能透過以下措施防範或減低破壞性：

- 良好的排水系統，應定期檢查，避免淤塞。
- 藝術品避免存放於地面以下（如地下室），貯存區亦應提升離開地面。
- 藝術品貯存點的室內裝修應使用容易清理的材料，附近避免存放易污染物如油漆，以防對藝術品造成污染。

### 防災設備

1. 安置防火防災設備可在災害發生前給予預警，避免或減輕損失，如煙霧探測器、灑水器、漏水探測器等，這些設備亦應安排保養合約確保運作正常。
2. 低於標準或窗戶稀少的博物館建築，由於與外方隔絕性高，若火警發生，由外向內灌救困難，而機械式通風裝置的無窗戶建築在火災發生時很可能會發生故障及產生嚴重的煙霧損害，設有自動關閉的區隔及煙霧障蔽在這類建築中特別重要。

3. 在地層運動活躍的區域，地震造成的火災是主要的防範考量，確保滅火系統能於震後功能正常是建築設計的重點，而防止展場及貯藏區裏的藝術品掉落或被重物墜壓也是設計的重要考量。

### 優先救助卡

某一些意外事件，例如洪水或火災，存在緊急拯救一些具有極高歷史、文化和經濟價值的重要收藏品的可能性。為達到有效疏散指示，您應在災害防護規劃中考慮建立一個優先救助卡的方式。這些卡應盡可能簡單，而且可以在濃煙或黑暗燈光下閱讀。救助卡應保持穩固並置於顯眼位置，最好是在入口旁，但不要透露任何項目的價值。

### 規劃包括：

1. 一張建築物平面圖及每個房間的平面圖
2. 簡介卡：附作品的照片及簡短說明
3. 加注任何特殊安裝說明，例如需分拆或固定在牆身等
4. 把卡片過膠保持耐用
5. 謹記只有較小的物品才可以移動，大件作品或家具應以防火氈作保護

### 緊急撤離計劃

對收藏機構造成威脅的災難認知（例如：火災、地震、颶風等）及評估。預先確立哪些為最重要收藏品而在災難中首先保護或轉移至安全位置。如有必要，

休館措施也是防止損害的方法之一，要言之，其原則不外是預先制定撤離路線，清楚有需要時向誰求援和重要的災害防止資訊。

### 人員配備及訓練

在所有策略資料齊全後，另一個關鍵便是整合及列出災難發生前/後應在場人員的職責，如選定小組領導人員、確保每名成員了解個人的職責及救助的優先次序。

最後，則是測試計劃的效果。透過人員的訓練、實際操練及執行分析評估，加入臨時的狀況和修正，改良策略。所有災害防止計劃在複製後必須與其它重要文件一樣，置放在遠離災難可及的收藏機構以外。

### 災後恢復規劃

災難恢復計劃是沒有一定標準化或大眾化格式，然而所有的災難恢復計劃應具有三種基本策略：（1）預防措施，（2）偵探的措施，以及（3）糾正措施。預防措施盡量避免災難的發生，這些措施旨在識別並降低風險及減輕或防止事件的發生。災難恢復計劃必須至少回答三個基本問題：（1）它的目標和目的，（2）任何中斷發生時由誰負責，以及（3）災難降臨時由誰遵循這些程序。

### 案例研究 - 針對颱風的防損措施

1. 安裝強力玻璃窗、雙層玻璃窗、鐵窗或鐵門。
2. 不要將藝術品或家具放在地下室或閣樓。
3. 整理並保存一套藝術品清單，詳列每件藝術品的

資料，包括名稱、藝術家、尺寸、材質、圖像，並保留發票。將資料保存在防火保險櫃或防水的儲物箱內。此外，將文件副本保存在其他單獨安全的位置，亦可選擇將資料轉換成電子檔，放在網上雲端，方便隨時隨地更新及提取。

4. 準備緊急電話號碼清單，包括你的保險代理人/經紀人，保險公司及您的保單號碼，文物修復師，藝術品儲存倉庫，藝術品運輸公司或具有空調的倉儲公司，還有緊急維修公司。

考慮為您的藝術品收藏準備一套颱風疏散計劃。聯繫當地的藝術儲存機構，在熱帶風暴或颱風到來之前，保證有足夠安全的存儲空間。如沒有一個颶風疏散計劃，確保藝術品貯存地點安裝有空調控制系統及除濕設備，它可以防止濕度上升，減少藝術品受潮損失。

### 颶風警告開始

1. 和藝術品運輸公司，倉儲公司聯繫，預備可能的撤離計劃。聯繫您的經紀人或保險公司以取得緊急聯繫資料。
2. 固定門窗或加裝防護窗、鐵捲門。
3. 確定哪些藝術品或家具可能需要運送到有恆溫控制的專業倉庫。如需移動，應通知你的保險經紀，以確保屬於承保範圍。
4. 掛在牆壁上的藝術品，應確保所有懸掛裝置安全緊固。鑲有玻璃框架的作品應加以固定防止摔落

破碎 注意有機玻璃上不應該貼上膠紙貼布。

5. 移動藝術品遠離窗戶，放在不易滲水的區域，置在架上離地至少 6 英吋。作品不要彼此堆疊，將它們彼此相鄰並排。如果存儲區域空間不夠，可用比作品大的紙板相隔堆疊。小幅油畫，紙上作品和小物件可以放置於防水或塑膠箱內。
6. 可能的話，將戶外雕塑移至室內，並用安全塑料薄膜包裝。固定在外的雕塑可以用粗麻布或毯子綁包，抵擋風沙和其他物品撞及。如果不能夠把戶外家具搬至室內，須將其卸下並固定。
7. 準備應急物資包括手電筒，電源充足的手提電話，AM / FM 收音機及備用電池

### 風雨過後：

1. 穩定環境，保護物品不再受風雨或潮濕影響。
2. 檢查所有物品有否受損／弄濕。
3. 拍攝任何受到損害的房間和藝術品。
4. 如有多項作品受損，先準備優先處理次序，如洪水泡過的紙類及木製家具尤其脆弱，須儘快安排檢查及修復。
5. 如果物品受到水波及，應於乾爽通風地方自然漸進將濕氣除去。千萬不可放置太陽底下曬乾，及直接以電風扇吹向物品。如果是背襯、墊或框架弄濕，可用毛巾或吸水紙輕輕吸去多餘的水分，有需要時應卸去背襯或框架。

6. 戶外物品應儘快除去任何包裹，用乾淨的水沖洗雕塑並輕力擦乾。
7. 將作品移至有空調的區域。如果沒有電源，可將物件移至有光源及空氣流通的地方。在高濕度、高溫度和陰暗的地方，霉菌快速發展，但在通風良好的條件，霉菌不易存活。
8. 風暴期間沙土及鹽可能沉積在作品上，可用軟毛刷和軟布擦拭金屬物體。
9. 盡快聯繫修復師，減少作品的損壞。
10. 在有任何損失的情況下，請立即與您的經紀人或保險公司聯繫。

當風險避免及損失減輕都無法確保您的財產安全時，保險則是最有效的危險轉移工具。對任何收藏機構或個人，保險雖無法回復收藏的毀損滅失，但周全的保險計劃可以提供財務上的補償以便收藏得到最有效及最專業的修復或財務支持以回復收藏的規模。但在安排保險時，確定尋找專業保險公司、保險經紀及確定保險覆蓋範圍及適當的保險金額可以反應收藏品的實際市場價額，以今您的收藏有最完善的保障。



# Negative Economic Impacts of ( $\pm 2^{\circ}$ C) X ART : Strategies for Art Industry Facing Climate Extremes

**Economic Impacts & Risk Management:  
A Case Study from Hurricane Sandy**

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## Works of Art Damaged in Hurricane Sandy

Sandy's insurance bill estimated at \$25 billion for Industry, making it the second most damaging hurricane on record after Hurricane Katrina in 2005. By widespread flooding and electrical blackouts, Sandy flooded almost N.Y.'s Chelsea Art District for several days, slowed down rescue work. Art insurance losses from Hurricane Sandy may reach \$600 Million, works by 1960s graphic artist and illustrator Peter Max, for instance, were severely damaged claimed of up to \$300 Million that becomes the largest single art loss to the market. Sandy is expected to cost the insurance industry annual premiums, resulting in the art insurance prices are forced to be increased for the following years. AXA ART, for example, expects to pay out \$40 million from Superstorm Sandy.

Hurricane Sandy can be regarded as a natural disaster and a result of global warming. Although we are not going to discuss the reasons cause global warming in today's session, I believe everyone has experienced a series of consequence s of global climate-change over the past decade.

In IPCC's report (Intergovernmental Panel on Climate Change, 2011), it defines climate extreme as the occurrence of a value of a weather or climate variable above (or below) a threshold value near the upper (or lower) ends of the range of 10%. The economic losses of climate extreme caused by global warming increased from \$20 billion in 1980s to \$200 billion in 2010s, and hit record high in 2005 by the Hurricane Sandy.

From the report's findings, the estimated losses due to weather-related disasters causing property

damage have been growing in the past years. The impacts of major catastrophe, as loss of human lives, cultural heritages, and ecosystem services, have become serious and widespread. In total, the estimated damages of global catastrophes in 2013 resulted in the deaths of 26,000 people and \$140 billion financial losses.

Based on the observation and statistics in the last 10 years, global warming has caused a series of effects to climate change and ecosystem. The most significant changes of affected weather and climate can be categorized as six phenomena:

1. Tropical Cyclones – evidences show that both wind speed and volume of rainfall of tropical storms become even more intensive in recent decades. In the 21st century, the highest wind speed might be up to 2-10%, and the volume of rainfall is projected to increase 3-31%.
2. Summer Heat Waves – extreme heat events have been encountered throughout the world in recent years during summer season. By observing the global temperature trends, the records show the warmest years on record have occurred since 1997, the global top ten warmest years has occurred after the year of 1990, and 2010 tied 2005 as the warmest year in the instrumental record. Average global temperatures are expected to increase by 10° F by 2100.
3. Drought – as temperatures rise due to global climate change, droughts have become longer and more extreme worldwide, particularly in the tropics and subtropics.
4. Wildfire – hot temperatures and dry conditions



brought on by longer summer season extended to autumn due to climate change are expected to increase the likelihood of wildfires. Lightning-sparked wildfires become more frequent occurrences during the dry summer season that such fires will become much fiercer in the coming years, enhance difficulty of risk control

5. Floods – Scientific research indicated that estimated sea levels worldwide rise for the 20th century was between 4-8 inches a year, and expected to reach to 36 inches in the next century, more areas could be flooded and at risk of being claimed by the ocean. Forcing by the extreme weather-change, flooding is expected to be even severe resulted from monsoon season during summer. The potential volume of rainfall is enormous due to global warming effect.

6. Snow Storm – climate change is expected to increase global temperatures and change rainfall patterns. More intense rainfall during summer season occur floods, and more heavy snow storms in winter in regions of Europe, Midwest and Northeast of America.

These disaster impacts can cause large destruction of properties and loss of lives. There is no exception to artworks. Humidity and temperature control are vital aspects of preserving art collection. If exposed to high temperatures for long time the surface and materials of artworks may deform or discolor permanently. On the contrary, if exposed to excessive low temperatures or over arid environment can lead to the breakdown of materials, causing it to deteriorate. When humidity levels become high, mold may begin to grow. Damage from fire or

flood, however, is even severe which may destroy artworks totally beyond repair.

### **Prevention and Risk Management**

Although disasters above may be unavoidable, setting an adequate risk management can positively prevent or reduce loss. Despite the precautionary steps for individual collectors, institutes, or museums may vary, some general principles below should not be ignored: such as physical security including design and construction, manned security, electronic security, fire detection and suppression, environmental control, inventory and asset controls including hanging and installation of art, institutional policies and procedures, management oversights and controls, contingency and emergency planning

#### **Location**

To avoid storing or displaying art collections in the areas of lowland, keep away from threaten of wildfires and beware of whether the storage is located in earthquake zones.

#### **Design and Construction**

The first priority of fire damage control is to consider the constructions of building, including:

1. Reinforced concrete or heat resistant steel are ideal materials of walls, ceilings and roofs of fireproof building construction, however, under the circumstances of choosing fire retardant materials, the collapse is still highly possible to be occurred. The placed location of precious

works should not be selected in the buildings made by flammable materials.

2. To a certain extent, it is possible to control the damage of fire under a certain area and amount. Well separation and spatial management is the best practice of keeping artworks away from fire points. Packing or repair areas need to be properly separated from exhibition and storage areas.
3. In addition, the following are measures you can greatly reduce or prevent losses caused by floods or storms:
  - o Always checking drainage systems regularly to prevent pipe blockages.
  - o Avoid placing artworks below ground level (such as basements,) storage space should be raised off the floor.
  - o Keep inside of storage easy to clean up. Never store paint or other pollution sources in order to prevent objects from being attached.

### **Disaster Preparedness Equipment Supplies**

1. Install fire safety equipment to protect your possessions, such as smoke detectors, fire sprinklers, liquid leak detection and so on. All devices should be subject to a maintenance contract and should be checked frequently in

order to make sure that they are up-to-date and ready for use.

2. Some museum buildings where the number of windows is less than minimum standards of fire safety, rescue efforts from outside could be difficult when a fire occurs, the mechanical ventilation system of windowless building could be disordered or severely damaged by smog. The self-closing and smoke barrier devices are, therefore, even required under this circumstance.
3. On the formation of active regions, how to prevent damages of fire caused by earthquakes becomes the principle of precautionary measures. To ensure the fire suppression system can sustain its main functions after earthquakes is one of key points of construction design. Additionally, it is important to prevent artworks in storage or display area from falling or crack on impact.

### **Priority Salvage Card**

During some accidents, such as flood or fire, it may be possible to direct emergency assistance to items of great historical, cultural or economic value. In order to make an evacuation as efficient as possible, you should consider creating a priority salvage card as part of your disaster planning. These cards should be as straightforward as possible as they may have to be read by smoky



conditions or torchlight. The salvage cards should be kept securely on site; ideally beside the principle entry point. Never disclose any items value.

1. Include a plan of the building and one of each room.
2. Use a photo of the object and add a short description.
3. Note any special removal instructions, e.g. if the piece comes apart; or is secured to the wall etc.
4. Laminate finished cards for durability.
5. Remember you can only remove the smaller more portable items. Larger pictures or pieces of furniture should be protected with fire blankets in situ.

### **Emergency Plan**

Emergency plane describes the awareness and evaluation of collecting institutions for natural hazards in terms of fires, earthquakes and hurricanes. The first priority is to identify objects and prioritize them in order of importance, to evacuate or relocate the collection in the event of an emergency. Shutting of utilities if needed. Determining steps to be taken, as well as to implement escape route to evacuate staff and the public, and contact external experts for support or assistance.

### **Staff Training**

After gathering all information, to identify the position or group responsible for implementing the emergency response plan is another crucial factor, such as appoint group leaders, ensure each stall understand personal responsibility and emergency procedures.

The last task is to evaluate the effectiveness of emergency response training. Through staff training, physical applications, performance analysis and evaluation, in order to identify and adjust the criteria used for provisional status and strategy improvement. All emergency plan handbook should create a backup copy and place outside of the collecting institutions.

### **Develop Recovery Procedures**

There is no one right type of disaster recovery plan, however, recovery procedures fall into three basic strategies: 1) preventing; 2) detecting; and 3) repairing. Prevention measures

Prevention measures aims to reduce, or avoid the potential losses from disaster. A recovery plan needs to meet three inquiries: 1) state its goal and purpose; 2) outline the responsibility of recovery team leaders; 3) identify who should follow these procedures.

### **Case study – Hurricane Damage Prevention**

1. Install fortified glass windows, shatterproof glass, iron windows or doors.
2. Do not store fine art or furniture in your basement or attic.

3. Prepare and maintain a fine art inventory file with images of each work, name of artist or maker, title, dimensions, media, and year. Include invoices for each item. Protect your documents by securing important papers in water- and fire-proof safes or storage boxes. In addition, keep a copy of all documentation at a separate, secure location, or upload your files in the cloud that makes it easy to backup or update at anytime.
4. Maintain a list of emergency phone numbers, which includes those of your insurance agents/brokers, insurance company (note your policy number), conservators, art storage facility, art transport company, and local freeze dry facilities, also include the details for an emergency generator.

Consider a hurricane evacuation plan for your art collection. Contact local art storage facilities that could potentially provide secured storage space prior to the arrival of the tropical storm or hurricane. In the absence of a hurricane evacuation plan, install a HVAC climate control system with a back-up generator, which can protect against rising humidity levels that can damage artwork.

### **As Hurricane Warnings Begin**

1. Make preliminary contact with service providers for generators, freeze-drying facilities, art packers, and art transport companies.

Contact your broker or insurance company with alternative emergency contact information.

2. Mount plywood over any exposed windows or doors.
3. Determine which fine art and furniture might be transported to a warehouse with power generator and climate control. Notify your insurance broker in advance of removing works to ensure proper coverage in the new location.
4. If works of art are left hanging on the walls, be sure all hanging devices are secure. Remember that wet plaster lacks structural integrity and works on plaster walls could fall. Glass on framed works can be taped to prevent shattering. Plexiglas should not be taped.
5. Move objects away from windows to a storm closet or to a water resistant area of your home. Elevate works at least 6" from the floor with blocks of wood or place them on shelves. Do not stack works on top of each other. Place them next to each other. If your storage area does not have racks, separate works with cardboard larger than the size of the frame. Protective crates can also be used to store multiple small paintings, works on paper and small objects. Cases should be waterproof and again, elevated off the floor.

6. If at all possible, bring outdoor sculptures inside, secure and wrap them in plastic sheeting. Sculptures left outside can be wrapped in burlap or blankets tied with rope to protect from flying sand or objects. If you are not able to bring outdoor furniture inside, bolt it down.
7. Prepare a stock of emergency supplies to include flashlights, hurricane lamps and oil, matches, battery-operated AM/FM radio with extra batteries.

#### **After the Storm:**

1. Ensure the safety of environment and prevent objects from being affected by wind, rain or humidity.
2. Check if all objects are damaged /wet.
3. Photograph your rooms and document any damages to works of art.
4. Furniture is particularly vulnerable when flooding occurs. Decorative wood elements may become loose or detached. Arrange to have these pieces of furniture treated by a conservator as soon as possible.
5. If objects are wet, move works to an air-conditioned area. Avoid direct sunlight and fans blowing. If backings, mats, and frames are wet, gently blot off excess moisture with towels or blotting paper gently. Remove backings and frames if necessary.
6. Remove any remaining wrapping on outdoor objects, rinse the sculpture with clean water and wipe gently.
7. Move works to an air-conditioned area. If there is no power, move works to a lighted area with air movement. Mold develops quickly in high humidity, high temperature, and darkness but cannot survive in well-ventilated conditions.
8. A fine layer of salt may have been deposited on works during the storm. Carefully dust secure works with a soft brush and wipe metal objects with a soft cloth.
9. Contact a conservator as soon as possible, as early treatment can reduce damages to paintings, sculpture, and works on paper.
10. In the event of a loss, contact your broker or insurance company immediately.

When loss prevention plan cannot help you to ensure the safety of property, insurance becomes the equitable transfer of the risk of financial loss. For collecting institutions or individual, even though the damage may be permanent, a comprehensive plan can provide financial compensation to support costs of reparation or reinstate the scope of collec-

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tions. A professional insurance company or agent not only helps its clients to protect their assets but also provides expert advice regarding all aspects of managing a collection including loss prevention, mitigation and conservation.



# 孫貴珍

安盛藝術品保險公司亞洲區總經理

過去 20 年曾任美商 AIU 保險公司及美商聯邦保險公司 (CHUBB) 台灣及香港分公司核保及賠償部門管理職位。2006 年加入 AXA ART 安盛藝術品保險集團 (AXA 集團附屬集團) 負責亞洲區業務。於 2009 年將服務範圍擴展到新加坡。於 2012 年透過安盛保險集團上海分公司於上海提供專業藝術品保險產品，目前透過安

盛及天平保險合資平台，更期望將服務延及中國其他城市。

AXA ART 乃全球唯一承保藝術品的專業保險公司，總部設在德國科隆，成立自今 50 年以來已承保全球主要博物館，大型藝術品展覽，個人及企業藝術收藏，市場佔有率為全球三分之一，亞洲區總部設在香港。

# Jennifer SCALLY

Regional Director, AXA ART Asia Limited

Jennifer Scally, Regional Manager of AXA Art in Asia. Jennifer joined AXA Art in 2006 with over 20 years of insurance experience. Before joining AXA Art, Jennifer had management positions in both Underwriting and Claims of AIU and Chubb Hong Kong and Taiwan. Jennifer has BA and MBA major in Insurance. Since joined AXA ART, Jennifer has established AXA ART operation in Singapore in 2009, and launched AXA ART service in Shanghai and

Beijing in 2012 through AXA China platform. AXA ART will continue extend the service to national-wide thru AXATP (AXA Tianping) acquisition.

AXA Art is an exclusive Fine Art insurance carrier in the world, with Head office based in Cologne, Germany. In past 50 years, AXA Art has insured major museums, exhibitions, private and corporate collection around the world, with market share over one third in globe art market. The Asia operation is based in Hong Kong.





# 趙琍

誠品畫廊總監

趙琍女士於 80 年代投入畫廊業，現任誠品畫廊執行總監。在累積逾 20 年之專業經歷期間，致力經營台灣現、當代藝術之優秀創作者，並以卓越前瞻的眼光發掘和推廣海內外傑出華人藝術家，均具備豐富的國際展覽經歷並為其建立了廣泛的收藏族群。

趙琍女士在與藝術家的長期合作中，建構起誠品畫廊具備國際水平之策展能力，以及與世界各地藝術組織、收藏家的合作網絡，在 2009 年更帶領誠品畫廊成為台灣第一個入選國際藝術博覽會之奧林匹克 Art Basel 的畫廊。除此之外，她積極引介亞洲其他地區之當代藝術。自 2013 年起，每年推出「兩岸青年藝

術家在誠品」之展覽計畫，不僅是為發掘華人藝術世界裡的明日之星，也希望透過此計畫，提供一個讓年輕藝術家被發掘、被看見的地方；誠品畫廊成為他們初試啼聲的首選平臺，同時在誠品畫廊，觀眾可以看到最好的藝術家和最好的藝術品。

趙琍女士亦經常擔任台灣公共藝術評審委員以及各公私部門之藝術顧問，使得誠品畫廊不惟在收藏界中備受肯定，在整體視覺藝術領域中，獲得極高的推崇，故於 2012 年獲得中華民國畫廊協會所頒發的資深經理人獎。

# Emily CHAO

Director, Eslite Gallery

Emily Li Chao started her career in the art business in 1980's and is currently the Executive Director of ESLITE GALLERY. Over 20 years in the field, Chao has engaged in exploring and promoting outstanding modern and contemporary artists in Taiwan and the Greater China as well as emerging artists. Chao has helped the artists to broaden their profiles both in terms of exhibition and collection.

With long-term collaboration with the artists, Chao has led the gallery to establish curatorial capability that meets with international standard and build up strong networks with art spaces and organizations over the world to offer a wide range of exciting works for collectors. ESLITE GALLERY became the first gallery based in Taiwan to participate in Art Basel in 2009. Chao also actively introduces contemporary

art from other regions of Asia. ESLITE GALLERY launched the “Young Artists Cross-Strait Exchange Exhibition Program” in 2013 not only to explore future star artists of the Greater China, but also to provide a platform for young artists to be seen. ESLITE GALLERY would be the place for outstanding young artists to make their first shots and where visitors see the best works from the best of artists.

Chao often takes the roles of exam committee member and consultant for public or private organizations in Taiwan. ESLITE GALLERY is renowned among the collectors as well as in the field of visual art. Chao was presented with the Senior Manager Award by the Taiwan Art Gallery Association in 2012.



# ±2° CXART 的負經濟效應： 極端氣候對藝術產業的影響與 因應對策

氣候變遷與災害：  
台灣藝術產業的因應措施與策略

許文科

中央大學災害防治研究中心副研究員兼任執行秘書

## 1. 前言

近年來，發生在全球各地的包含颶(颱風)、洪水、乾旱或熱浪等天氣災害，對人命與經濟造成重大損失，此提高了各地領導人或決策者對自然力量所會造成其經濟體衝擊的重視。而其亦普遍認知到在未來數十年有中，二種主要的趨勢會增加氣象災害之可能損害，其中之一為持續的經濟發展，造成將更多的人或更高的資產置於毀滅性的天氣可能侵襲之地區；另一為氣候變遷造成的全球暖化，許多科學家相信其已經改變降雨的型態、增加暴風雨與乾旱事件發生的頻率與嚴重性，並且逐漸造成海水位與氣候區的移動。

從全球的角度來看，隨著都市化及集中化發展，人口及財產的分佈集中在少數都市，使得整體社會的災害風險曝露值 (Exposure) 日趨增大，各種災害的發生所造成之損失規模亦有隨時間增加的趨勢。圖 1.1

所示為全球最大的再保險公司 - 慕尼黑再保險公司統計 1950 年至 2009 年全球氣候與天氣相關天然巨災發生次數之統計，以趨勢來看，近年有增加之趨勢；圖 1.2 所示則為經濟損失與保險損失之統計資料，由統計資料可看出全球氣候相關災害所造成之經濟損失整體有增加趨勢，但具有相當大的年代變異。人口的增加與經濟的快速發展，為造成損失增加之主要因素，依統計資料 1950 年全球人口數約 25 億人，2009 年則已達 68 億人；而在同一期間，全球之 GDP 成長約 10 倍；同時全球人口預期將持續增長，預測 2040 年時全球人口將達 90 億人。而除風險曝露集中、增加之外，亦促使各類社會或經濟活動區域持續往易受災地區拓展，尤其是天氣災害敏感地區，此亦為造成近年損失增加之原因。

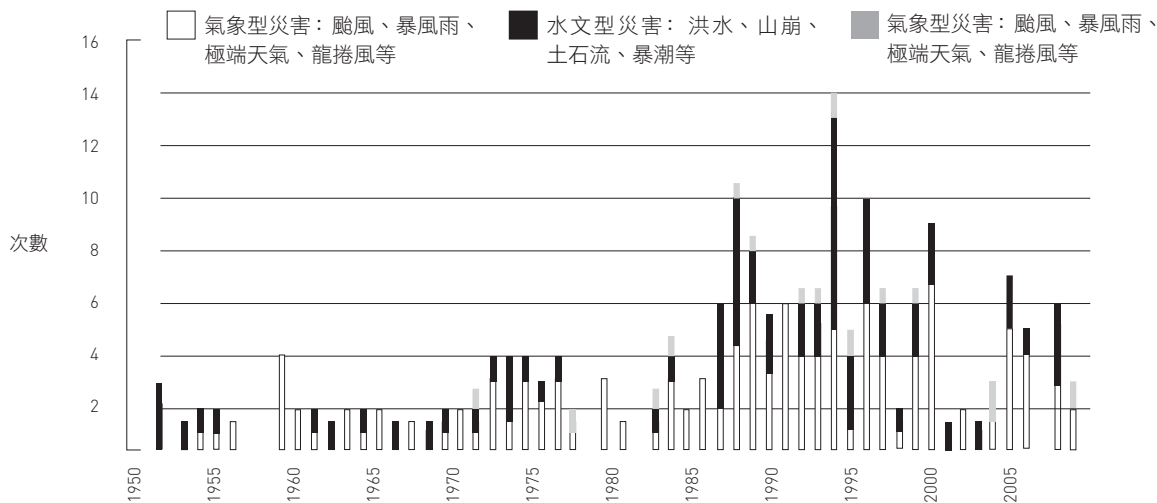


圖 1.1 1950 年至 2009 年全球氣象相關巨災發生次數之統計

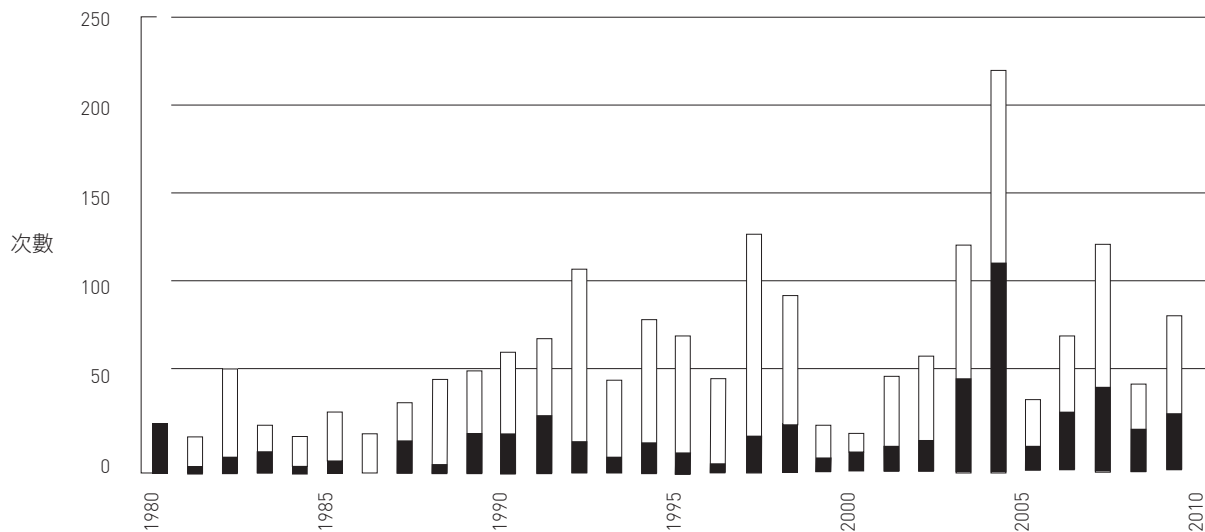


圖 1.2 1980 至 2010 年全球氣候相關災害所造成之經濟損失與保險損失

資料來源：Munich Re

而由圖 1.2 中除經濟損失有增加趨勢之外，亦可看出保險損失亦有明顯增加之趨勢，而其主要因為災害風險管理之觀念在先進國家已逐漸被重視，尤其是透過災害保險將風險移轉至保險業或資本市場之風險移轉工具之使用，例如 2005 年美國卡崔納颶風造成人類有史以來最大之 1,250 億美元氣象災害經濟損失，其中有約一半之損失由保險業所承擔，但在中度或低度開發國家則保險所分擔之天然災害損失所占比例則非常的低。

整體而言，在過去的 50 年，大型的天氣災害造成約 80 萬人死亡與超過一兆美元的經濟損失 (ECA, 2009)，而且近十年天氣災害所造成之損害更是屢破記錄，例如 2008 年納吉斯颶風造成數十萬人死亡；2007 年夏天英國大洪水造成 80 億美元經濟損失損

失，為英國史上最大之水災；2005 年美國卡崔納颶風造成超過 1000 人死亡與 1,250 億美元的經濟損失，為人類有史以來經濟損失最大之天氣災害；又如 2003 歐洲受熱浪侵襲，造成超過 35,000 人之死亡，為歐陸近幾世紀最大之天然巨災事件。

雖然難以對個別天氣災害歸納其是否全為氣候變遷所致，然而一般公認的氣候變遷所會造成的現象如全球平均溫度升高、海水位上升、降雨型態改變與極端天氣事件發生頻率與嚴重性增加等 (如圖 1.3 所示)，其均可能造成與近年來的重大天氣災害的頻率與嚴重性增加之相同趨勢。

因此，全球尤其是先進國家之政府部門多嚴肅看待，並投入資源進行因應氣候變遷之相關策略研

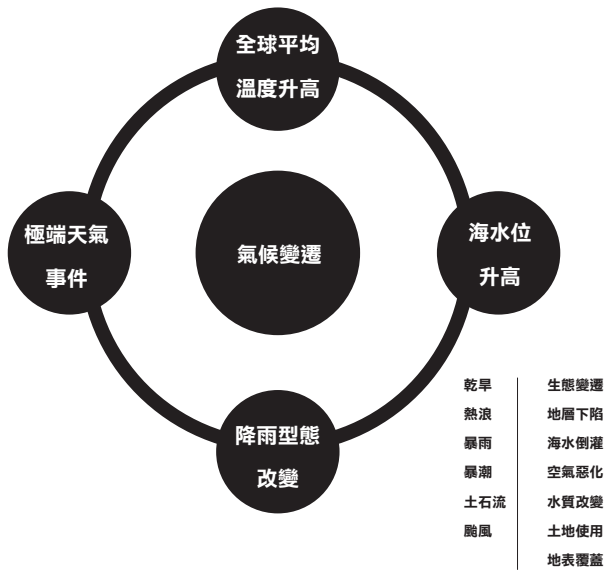


圖 1.3 氣候變遷造成之現象與影響

究。為因應氣候變遷所引發之問題，決策者需要瞭解有關氣候變化的成因，潛在環境和社會經濟的衝擊影響，以及可能的因應對策，世界氣象組織 (World Meteorological Organization, WMO) 與聯合國環境規劃署 (United Nations Environment Programme, UNEP) 於 1988 年成立跨政府氣候變遷小組 (Intergovernmental Panel on Climate Change, IPCC)，IPCC 的角色定位是在全面、客觀、公開和透明的基礎上，藉由彙整有關全球氣候變遷最好的現有科學、技術社會經濟的研究成果與資訊，以發行評估報告等的方式，針對全球氣候變遷的議題提供決策者、科學家與專家參考，IPCC 組織更獲得 2007 年諾貝爾和平獎。IPCC 第一次評估報告 (IPCC FAR) 於 1990 年發表，促使聯合國大會制訂氣候變遷公約 (UNFCCC)，1995 年 IPCC 發表第二次評估報

告 (IPCC SAR) 『Climate Change 1995』對著名的京都議定書做出貢獻，2001 年第三次評估報告 (IPCC TAR) 『Climate Change 2001』及 2007 年第四次評估報告 (IPCC AR4) 『Climate Change 2007』，更是結合了 130 多個國家，超過 2500 名科學家所做出的完整評估報告，分別針對氣候變遷的現象、成因與氣候變遷所造成的衝擊、調適與脆弱度提出完整報告，並對如何減緩氣候變遷提出整體整合評估，下圖為 IPCC-AR4 對過去 100 年相關觀測結果與未來 100 年推估的結果。

IPCC 並於 2013 年 9 月 30 日公布氣候變遷第五次評估報告—第一工作小組報告的最終版草案 (final draft of Working Group I-AR5)，第五次評估報告根據四種情境推估的 21 世紀末暖化程度在平均值方面為攝氏 1.0-3.7°C，上下限為 0.3-4.8°C，略小於第四次評估報告的 1.8-4.0°C 與 1.1-6.4°C。但是第五次評估報告四種情境與第四次評估報告採用的多種情境定義不太一樣，因此不能詮釋為第五次評估報告推估的暖化程度較弱。IPCC 利用新的情境針對超越 2°C 門檻的可能性進行 21 世紀末增溫 2°C 的推估，除了減緩路徑情境（最低的人為溫室氣體排放量情境，未來數年溫室氣體排放些微增加，在 2020 年後迅速降低）之外，其他 RCP 情境溫度推估超過 2°C 的機率很大；第五次評估報告明確提出需要更積極降低溫室氣體排放量，以降低暖化程度。降雨推估顯示乾濕區以及乾季與濕季降雨量對比越來越強，但有些地區例外；對極端事件（如熱浪、豪雨、乾旱、極端高海面高度事件等）與第四次評估報告結果大致相同；依據



### 過去 100 年 ( 觀測 )

1. 全球平均溫度上升  $0.74^{\circ}\text{C}$
2. 海水位平均每年上升  $1.8\text{mm}$ ，  
近 10 年上升速度增加為每年  $3.1\text{mm}$
3. 劇烈降雨與乾旱的頻率強度有增加趨勢
4. 發生極端高溫的頻率增高

### 未來 100 年 ( 預測 )

1. 未來溫度將上升  $1.8^{\circ}\text{C}$ ~ $4^{\circ}\text{C}$ ，極端情況將  
上升  $6.4^{\circ}\text{C}$
2. 海平面高度預估平均上升 10~20 公分
3. 熱浪及豪大雨之頻率極可能會持續增多，乾  
旱的強度與頻率將會增加
4. 預估東亞地區的冬天雨量減少，夏天雨量增  
加

資料來源：監察院 ( 2012 )，頁 2-3

圖 1.4 IPCC-AR4 之觀察與預測

第五次評估報告，情境推估的暖化程度低於第四次評估報告，海平面上升的推估值 ( 上下限 0.26-0.82 公尺 ) 卻略高於第四次評估報告的推估值 ( 0.18-0.59 公尺 )；不管哪種溫室氣體排放情境，暖化程度與人為溫室氣體累積總排放量成正比，任何的減排措施都有助於減緩暖化程度。

## 二、 台灣地區氣候變化與相關災害

依據臺灣氣候變遷科學報告 (2011) 使用台北、台中、台南、恆春、台東、花蓮等 6 個具 100 年以上完整觀測記錄的氣象測站資料計算，發現臺灣年平均溫度在 1911 年至 2009 年期間上升了  $1.4^{\circ}\text{C}$ ，增溫速率相當於每 10 年上升  $0.14^{\circ}\text{C}$ ，較全球平均值高 (每 10 年上升  $0.074^{\circ}\text{C}$ )。惟此處，臺灣的年增溫率計算是採用陸地之平地測站，而全球平均值則包含海洋及陸地的平均值。此外，全球增溫有地域性的差異，增溫速率較全球平均值高，並非臺灣獨有的現象。臺灣近 30 年 (1980~2009) 氣溫的增加明顯加快，每 10 年的上升幅度為  $0.29^{\circ}\text{C}$ ，幾乎是百年趨勢值的兩倍。

臺灣屬於高災害風險區域，且同時受多種災害影響，臺灣的災害特性與全球趨勢一致，以水文氣象災害為主。如下圖所示，根據近年來的災害統計分析，臺灣的災害次數增加且災害特性改變 (近年來多屬水土複合型災害)，災害程度也有加劇 (災害損失增加與牽涉層面變廣) 的現象。災害變嚴重的原因與極端

事件的增加以及自然與社會環境變遷有關。

依據臺灣氣候變遷科學報告 (2011) 之回顧統計資料顯示，近年臺灣重大颱風洪水災害與極端降雨的增加有關，不論是短延時降雨強度 (1 小時至 6 小時累積降雨) 或是長延時降雨強度 (超過 48 小時累積降雨)，在近 10 年 (2000~2009) 有增加的趨勢。以 1960~2009 年的颱風降雨統計資料為例，極端強降雨颱風 (排名前 10% 的颱風降雨)，往往造成臺灣重大災害 (如莫拉克、賀伯、納莉)。此颱風極端強降雨發生的頻率在 2000 年以前，平均 3~4 年發生一次，在 2000 年以後則平均每年就發生一次。雖然上述極端降雨強度增加是否可以完全由全球暖化的衝擊來解釋，在科學上仍有討論空間，但此現象所呈現的氣候變異特徵對災害風險的提高無疑是一大警訊。同時，必須一提的是臺灣近年災害的程度加劇，除了伴隨者氣象上極端事件的增加外，環境變遷也是重要因素之一，包括 921 地震後的影響、地層下陷問題、山區的過度開發與建設、都市化與經濟發展需求等，都是導致災害更為嚴重的重要因素。

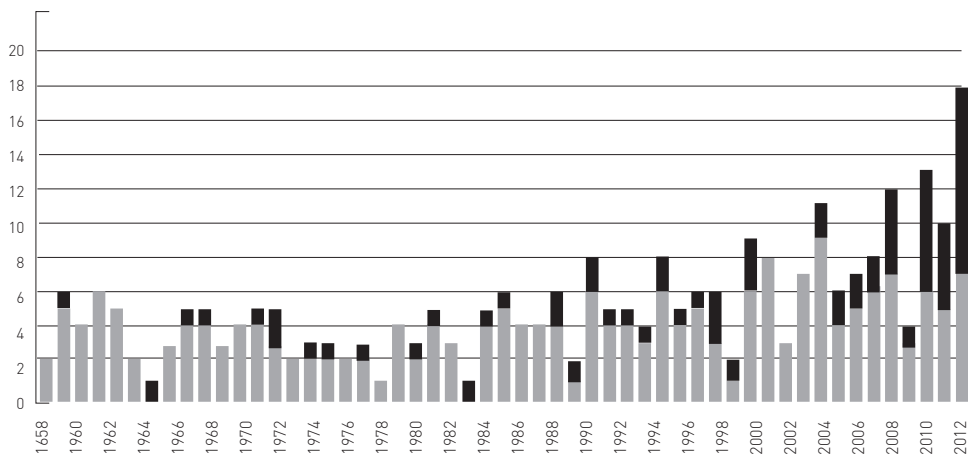
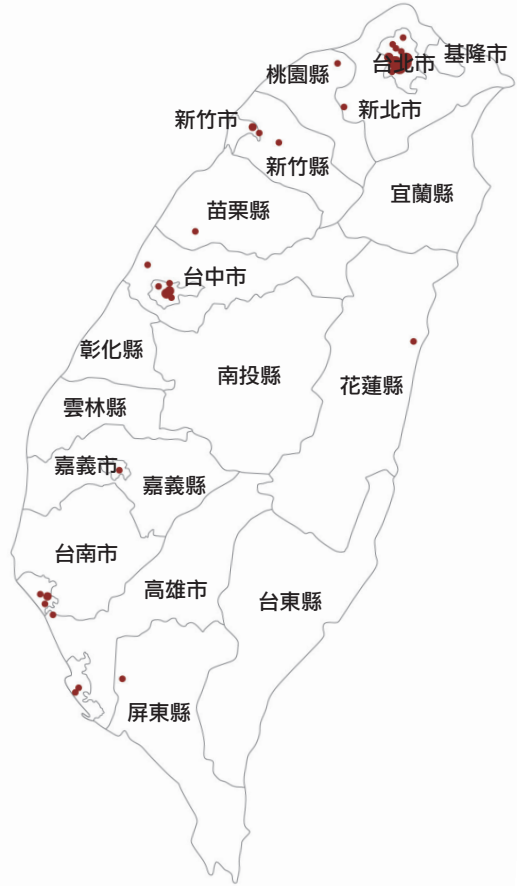


圖 2.1 台灣地區颱風洪水災害發生次數之統計



### 三、 氣候變遷對藝術產業的影響

因為全球氣候的變異，將對藝術產業造成二大面向的影響，第一為極端天氣事件所造成的災害，如洪水或風災對藝術品造成直接致命性的破壞；第二為氣候的變異造成藝術品保存維護的難度或成本增加，如溫度、濕度的變化。其中第二種影響多可用工程技術方式克服，第一種影響則無法全以工程技術克服，且可能造成重大無可彌補之損失。下圖為畫廊協會會員所有畫廊的分布圖，為瞭解協會會員畫廊所在位置是否位於淹水災害潛勢區域內，分別套疊經濟部水利署日累積降雨量為 150mm、300mm、450mm 與 600mm 之淹水潛勢圖，可知協會會員在日累積降雨量 150mm 與 300mm 情境下並無會員畫廊座落在水利署淹水潛勢區內，在 450mm 情境下則有 8 家，600mm 情境下則有 33 家。因水利署淹水潛勢圖之產制仍有其資料與模型上的侷限與不確定性，並進行相關假設而得，故上述結果不代表座落在潛勢區內就一定會淹水，或座落在潛勢區外就不會淹水，但仍可作為提昇風險意識與防災整備之參考。



## 四、 因應措施與策略

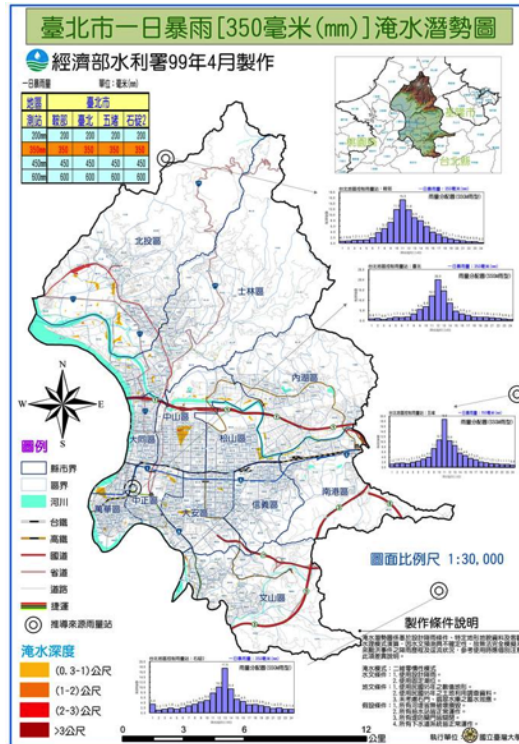
因應氣候變遷下可能帶來的極端天氣事件災害的影響，藝術產業可以下列作為減輕災害事件可能的衝擊。

### (一) 減災 (mitigation) :

- 瞭解自身所在處所之危險性：除蒐集自身附近區域以往是否有淹水經驗之資訊外，經濟部水利署於民國 96 年至 99 年完成全國第二版之淹水潛勢圖，其依縣市分類提供需要者免費下載 (<http://www.dprc.ncku.edu.tw/download/index.html>)，其可提供查詢自身所在地是否位於指定降雨情境下的淹水潛勢區域內。惟此圖資係以水文水力模型推估而得，有諸多參數假設，可能無法完全反應實際狀況，但具有參考價值，如下圖所示即為台北市一日暴雨達中央氣象局「超大豪雨」(日累積降雨量達 350 毫米)標準時之可能淹水潛勢，圖中以紅黃區塊標示可能淹水範圍與深度。
- 易受水損之財物(如畫作等)儘量往高處置放，避免設置於地下室，尤其是位於淹水潛勢區內之畫廊。
- 於可能進水口設置防水柵門。
- 投保災害保險，以於不幸受災後，取得保險理賠金，降低災害之損失。

### (二) 整備 :

- 擬好災害時之應變計畫，規劃好任務分工與作業



程序，平時並作好災害時之應變演練，以利災時充分發揮，降低損失。

2. 汛期前，備妥沙包或環保沙包。
3. 應充分掌握各種災害預警資訊：針對颱風、洪災害，除大家熟知的交通部中央氣象提供各種天氣之預測資訊之外，經濟部水利署亦建置有多元的管道傳遞各種颱風、洪災害之預警資訊，其均有助於預先瞭解可能狀況，預作準備，及時應變。茲將各種資訊取得管道與功能概要說明如下。水利署防災資訊網 ([http://fhy.wra.gov.tw/PUB\\_WEB\\_2011/Default.aspx](http://fhy.wra.gov.tw/PUB_WEB_2011/Default.aspx))

在本網站中提供有豐富的防汛相關天氣、水文資訊與各項警戒資訊，一般民眾均可以電腦或行動裝置上網連結查詢。如下表所示為網站所提供之台北市大安區淹水警戒雨量與即時監測之雨量。

### 淹水地區簡訊告知

經濟部水利署提供對豪大雨、河川水位、水庫洩洪等達警戒標準之免費簡訊告知服務，需要之民眾可利用電腦 / 手機網頁註冊 ([http://fhy.wra.gov.tw/PUB\\_WEB\\_2011/Page/DisasterTools.aspx](http://fhy.wra.gov.tw/PUB_WEB_2011/Page/DisasterTools.aspx))，每一民眾可註冊三個鄉鎮市區之警戒資訊，所註冊之鄉鎮市區無論雨量、河川水位或水庫洩洪達警戒標準時，即自動發簡訊至冊之手機。

### 接收淹水語音廣播

經濟部水利署提供對豪大雨、河川水位、水庫洩洪等達警戒標準之註冊市話之免費語音廣播服務，需要之民眾可利用電腦 / 手機網頁註冊 ([http://fhy.wra.gov.tw/PUB\\_WEB\\_2011/Page/DisasterTools.aspx](http://fhy.wra.gov.tw/PUB_WEB_2011/Page/DisasterTools.aspx)) 或市話語音錄音方式註冊 (0800-079579)，無論雨量、河川水位或水庫洩洪達警戒標準時，即自動語音廣播至註冊之市話話機。

參考雨量站	1小時雨量 (mm)			3小時雨量 (mm)			6小時雨量 (mm)			12小時雨量 (mm)			24小時雨量 (mm)		
	即時	二級警戒	一級警戒	即時	二級警戒	一級警戒	即時	二級警戒	一級警戒	即時	二級警戒	一級警戒	即時	二級警戒	一級警戒
公館	0	60	70	0	100	120	0	140	170	0	250	280	0	32	350
	〔大安區〕警戒範圍：大安區 - 基隆路三段，長興街，敦化南路一段、大安路一段、忠孝東路四段														
市政中心	0	60	70	0	100	120	0	140	170	0	250	280	0	320	350
	〔大安區〕警戒範圍：大安區 - 基隆路三段，長興街，敦化南路一段、大安路一段、忠孝東路四段														

行動水情 APP(請至 Android、IOS、WP8 系統下載)

經濟部水利署提供不同作業系統之行動水情 APP，有智慧型行動通訊裝置民眾均可免費下載安裝，其提供目前所在區域定位服務，並告知附近最新警戒訊息。同時提供全台灣雨量、水位、水庫監測站最新資訊、最新警戒圖、氣象預報等圖資查詢服務。經由此 APP 亦可查詢全台灣最新 CCTV 監視影像，即時掌握現地狀況。

## 5. 結論

2010 年末與 2011 年初澳洲世紀大洪水造成重大損失後，聯合國已發表聲明，認為在未來無法預知的極端天氣下，災害損失的將成為新的常態 (new normal)。面對極端災害的常態化，過去對災害的所認知的觀念「天災」(natural disaster) 需要適度調整為「人為災害」(man-made disaster)，顯現人為環境變遷對災害衝擊的重要性，聯合國也呼籲世界各國政府必須有計畫性的正視此問題。

減排 (Mitigation) 與調適 (Adaptation) 為目前全球因應氣候變遷的主要策略，人類短期無法扭轉氣候變遷之趨勢，但透過溫室氣體的減排措施，將有助於減緩暖化程度。氣候變遷對藝術產業的影響，主要為藝術品的保存維護問題與極端天氣所造成災害的衝擊，其中又以極端天氣災害之威脅更大，因此採取適當的調適策略，如瞭解自身面對的威脅，採取減災措施，或善用各種監測預警資訊，均可降低氣候變遷所帶來之可能衝擊。



# Negative Economic Impacts of ( $\pm 2^{\circ}$ C) X ART : Strategies for Art Industry Facing Climate Extremes

**Climate Change and Natural Disaster:  
Art Industry Action Plan for Prevention/Recovery**

**Wenko HSU**

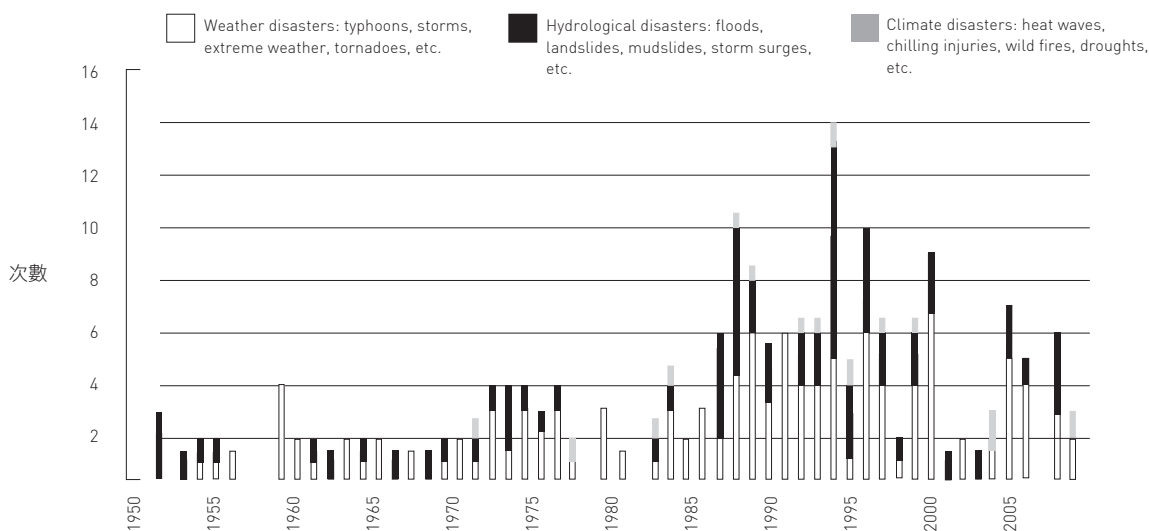
Executive Secretary & Associate Research  
Fellow, Research Center for Hazard Mitigation  
& Prevention, NCU



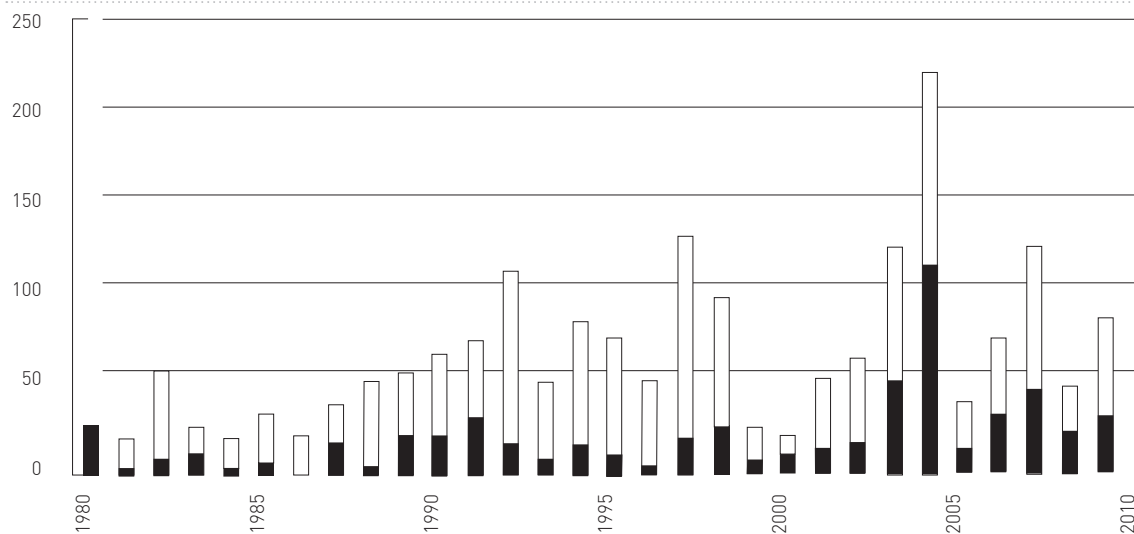
## I. Preface

In recent years, storms, floods, droughts, heat waves, and other natural disasters have been detrimental to human life and the economy. This has increased awareness among world leaders and policymakers of the economic impact natural forces may have. The general perception is that, in the next decade, there are two main trends that will increase the damage brought on by climate disasters. One is that sustained economic development will lead a higher concentration of human capital and assets in regions vulnerable to catastrophic weather. The other is that climate change will cause global warming. Many scientists believe that rainfall patterns have been altered and both frequency and severity of storms and droughts have increased. This will also lead to gradual changes in sea levels and climate zones.

From a global perspective, populations and wealth will largely be concentrated in a small number of cities as regions undergo urbanization and development becomes more concentrated. This will cause exposure of society to increase. Scale of losses stemming from various disasters will also increase with time. Graph 1.1 shows statistics compiled by Munich Re, the world's largest reinsurance company, of global climate and weather related catastrophes from 1950 to 2009. The trend shows that incidents have been increasing recent. Graph 1.2 shows economic losses and insurance losses. The data shows that economic losses stemming from global climate disasters have been on the uprise, but there is a large variation over the years. Population growth and rapid development of the economy is one of the main contributing factors to the rise in losses. According to calculations, global population in 1950 was 2.5 billion. The number



Graph 1.1 Number of global and weather related catastrophes from 1950 to 2009



Graph 1.2 Economic and insurance losses caused by climate related disasters from 1980 to 2010.  
Resource : Munich Re

reached 6.8 billion in 2009. In the same time period, global GDP grew by a factor of 10 times. Global population growth is expected to continue, with predictions that it will reach 9 billion in 2040. As risks continue to increase and come to light, social and economic activity continues to expand to vulnerable regions, especially those susceptible to natural disasters. This is another reason behind the recent increase in losses.

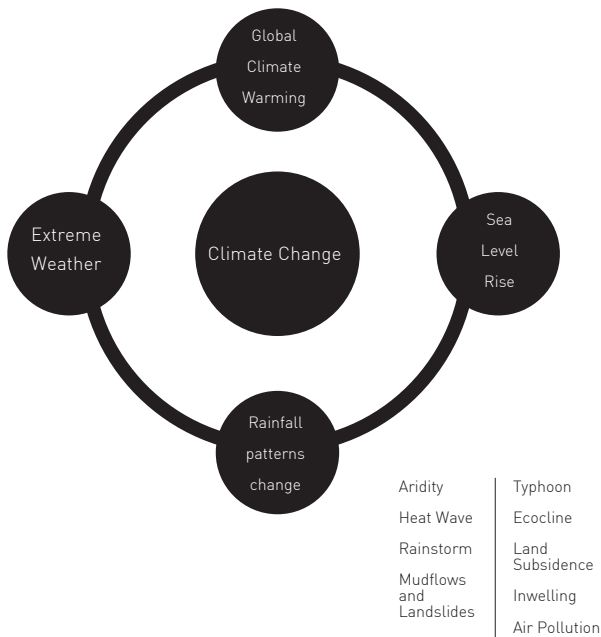
Apart from an increase in economic losses, we can also see in graph 1.2 that there will also be an increase in insurance losses. One of the main reasons behind this phenomenon is that developed countries are becoming more aware of disaster risk management. Even more so is the use of risk transfer tools such as insurance or the capital market. For example in 2005, Hurricane Katrina caused \$125 billion of weather related economic

losses, the largest amount in history. Half of the losses were covered by insurance, but this type of insurance coverage is rare in developing or least developed countries. . The IPCC published its fifth assessment report (final draft of Working Group I-AR5) on September 30m 2013. This report utilized four scenarios to estimate that

In the past 50 years, large weather disasters has been the cause of 800,000 deaths and \$1 trillion in economic losses (ECA, 2009). Losses in the past decade have been higher than ever. Cyclone Nargis in 2008 killed 100,000 people. The biggest flood in the history of the United Kingdom took place during the summer of 2007 and caused \$8 billion worth of damages. In 2005, Hurricane Katrina caused the deaths of 1000 people and \$125 billion in damages, which was the highest amount of economic damages caused by a weather disaster in history. Heat

waves engulfed Europe in 2003, resulting in the deaths of over 35,000 people. This was the largest natural disaster in continental Europe in the past few centuries.

Although it is difficult to determine whether each weather disaster is a direct result of climate change, the general consensus is that climate change will lead to an increase in average temperatures, sea levels, rainfall patterns, and extreme weather incidents (as graph 1.3 indicates). This may lead to trends that are in line with the recent increase in frequency and severity of disasters.



Graph 1.3 The phenomenon and impact of climate change

The IPCC published its fifth assessment report (final draft of Working Group I-AR5) on September 30m 2013. This report utilized four scenarios to estimate that temperature rise by  $0.4-4.8^{\circ}$  C, with averages between  $1.0-3.7^{\circ}$  C. This was slightly less than the  $1.8-4.0^{\circ}$  C and  $1.1-6.4^{\circ}$  C predicted in the fourth assessment report. But the four scenarios used in the fifth assessment reports were defined differently than those in the fourth report. Hence, we cannot conclude that the estimates in the fifth report predicted less severity in global warming. The IPCC used these new scenarios to postulate on the theory of a  $2^{\circ}$  C increase by the end of the 21st century. Representative Concentration Pathways (RCPs) 2.6 which assumes that emissions will increase before it peaks at and rapidly decrease after 2020. Other RCPs predict the chances the temperature increase will surpass  $2^{\circ}$  C is significant. The fifth assessment report clearly states that we need to take even more initiative in lowering emissions in order to curb global warming. Rainfall estimates show that the contrast between dry and wet zones, dry season and wet season will become even more apparent. But there are exceptions. Findings are largely similar with the fourth assessment report when it comes to extreme incidents such as heat waves, torrential rain, droughts, and extreme sea surface height. According to the fifth assessment report, RCP assumptions for global warming are lower than the fourth report. Estimates for sea levels ( $0.26-0.82m$  increases) are slightly higher than that of the fourth report ( $0.18-0.59m$ ). Regardless of the RCP, the extent of warming is proportional to the overall anthropogenic greenhouse gas emission and any form of emission reduction will help slow global warming.





### The Past Century (Observations)

1. Global temperatures rose an average of 0.74° C
2. Sea levels have risen an average of 1.8mm. This has increased to an annual rise of 3.1mm in the past decade
3. Frequency of torrential rainfall and droughts have increased
4. Frequency of extremely high temperatures have increased

### The Next Century (Predictions)

1. Temperatures will rise between 1.8 ° C and 4° C in the future. It may rise 6.4° C in extreme circumstances
2. Sea levels are predicted to rise between 10-20 centimeters
3. Increase in frequency of heat waves and severe rainfall are very likely. Frequency and severity of droughts will increase
4. It is predicted that rainfall levels in East Asia will decrease in the winter and increase in the summer

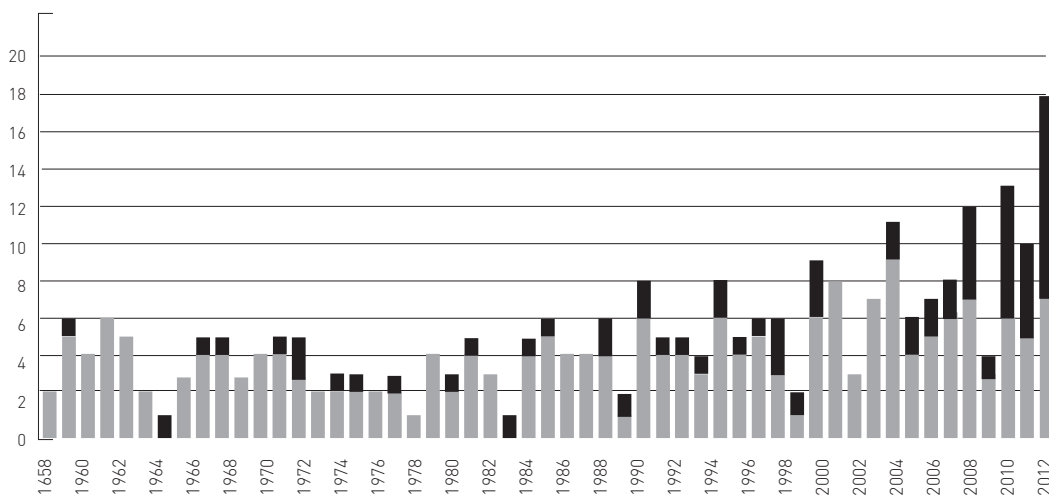
Graph 1.4 shows the observations and predictions of the IPCC-AR4

## II. Climate Change and Related Disaster in the Taiwan Region

The Scientific Report on Climate Change in Taiwan (2011) used 100 years of data collected from meteorological stations in Taipei, Taichung, Tainan, Hengchun, Taitung, and Hualien. It discovered that Taiwan's average temperature rose by 1.4° C from 1911 to 2009. This is equivalent to an increase of 0.14 ° C every decade, which is higher than the global average of 0.074 ° C per decade. But the data in Taiwan was taken from meteorological stations on land whereas the global average was calculated from data taken from both land and ocean meteorological stations. In addition, there are regional differences in global warming. When it comes to a temperature increase that is faster than the global average, Taiwan is not alone. Taiwan has seen rapid temperature increases in the past 30 years (1980-2009), with a 0.29 ° C incremental increase every decade. This is almost twice the speed of secular trends.

Taiwan is located in a region at high-risk for disasters and is affected by a plethora of disasters. Disasters in Taiwan are in line with the global trend of mainly hydrometeorological disasters. According to statistical analysis of disasters in recent years as indicated in the graph, the number and nature of disasters in Taiwan have changed (recent disasters have been a hybrid of water and land.) Severity of these disasters have also increased (losses have increased and dimensions have expanded). Increases in the severity of disasters and in the number of incidents are all related to changes in the natural and social environment.

According to the statistics in The Scientific Report on Climate Change in Taiwan (2011), increase in the number of major typhoons and floods in recent years are related to heavy rainfall. Whether it be short periods of heavy rain (1-6 hours of accumulated rainfall) or long periods (over 48 hours of accumulated rainfall), both have been on the rise in the past decade from 2000 to 2009.



Graph 2.1 the number of major typhoons and floods in Taiwan



If we look at typhoon rainfall data from 1960 to 2009, extreme rainfall typhoons (those top 10% of typhoon in terms of rainfall) typically do the most damage to Taiwan, for example: Morakot, Herb, and Nari. Prior to 2000, a storm of this scale took place, on average, every 3-4 years. After 2000, the frequency increased to, on average, once a year. There is still room for scientific discussion on if global warming is causing the increase in extreme rainfall. But the change in weather is, without a doubt, a warning sign for disasters risks. At the same time, it is worth mentioning that in addition to an increase in extreme weather incidents, changes in the environment is also another reason for the increase in disaster severity. These changes include the affects of the 921 Earthquake, land subsidence, over development and construction of mountainous regions, urbanization and economic development. and ocean meteorological stations. In addition, there are regional differences in global warming. When it comes to a temperature increase that is faster than the global average, Taiwan is not alone. Taiwan has seen rapid temperature increases in the past 30 years (1980-2009), with a  $0.29^{\circ}\text{C}$  incremental increase every decade. This is almost twice the speed of secular trends.

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incidents are all related to changes in the natural and social environment.



### III. The Impact of Climate Change on the Art Industry

Impact on the art industry from climate change is twofold. First, disasters such as floods may damage artwork beyond repair. Second, changes in the climate, such as temperature and humidity, may increase difficulties or cost of storing and preserving artwork. The latter issue can be resolved with technology, but the former cannot be and may lead to irreversible damage. The graph below is a distribution map of all the galleries in the Taiwan Art Gallery Association. We can use the Water Resources Agency's potential flood map with indication of 150mm, 300mm, 450mm, and 600mm rainfall prediction to see if any galleries are in potential flood zones. Results show that no galleries will be in the flood zone if the rainfall is 150mm or 300mm but there will be 8 galleries at risk if rainfall is 450 and 33 if rainfall is 600mm. The Water Resources Agency map was produced from data and models that limited to a certain extent, thus it does not mean that all galleries located in the potential flood zones will be flooded, or that those outside of the zone will not be flooded. It merely serves as a reference to raise awareness about risk and prevention.

### IV. Contingency measures and strategy

The art industry can take the following measures to minimize the impact of disasters and extreme weather brought on by climate change.

1. Mitigation:
  - a) Understand the dangers of your location: Collect information on past floods in the surrounding area. The Water Resources Agency published a second edition of the national potential flood map from 2007-2010. This map is divided up by city and county. Download it for free at <http://www.dprc.ncku.edu.tw/download/index.html> and see if you are in a potential flood zone with different levels of rainfall. This map was a result of hydrologic and hydraulic models. There are many parameters involved, so it may not be completely accurate, but it is a valuable reference. For example, the graph below shows potential flood zones when rainfall during a single day in Taipei can reach what the Central Weather Bureau deems "extremely torrential rain" (defined as 350mm accumulated rainfall in one day). The red and yellow areas in the picture show the flood zone and possible depth.
  - b) Pieces that may easily be damaged by water (such as paintings) should be placed in high areas and should avoid basement storage, especially for galleries located in the potential flood zone.
  - c) Install floodgates at possible points of flood entry.
  - d) Invest in disaster insurance in order to



To sign up, use a computer/mobile device and log on to [http://fhy.wra.gov.tw/PUB\\_WEB\\_2011/Page/DisasterTools.aspx](http://fhy.wra.gov.tw/PUB_WEB_2011/Page/DisasterTools.aspx) or sign up over the phone at 0800-079579. All alerts on rainfall, river water levels, and reservoir discharge will be notified via an automated call to a land line when the numbers meet alert criteria.

**Water Information on the Go app (Use Android, IOS, and WP8 systems to download the app).**

The Water Resources Agency offers this app on various mobile operating systems. This app is free for download onto a smartphone. The app offers alerts on the surrounding areas based on location services. It also offers information such as rainfall levels for all over Taiwan, water levels, information from reservoir monitor stations, newest alert maps, weather forecast, etc. You can use the app to see CCTV surveillance footage all over Taiwan in order to keep abreast of the situation.

**V. Conclusion**

After the record breaking floods in Australia at the end of 2010 and beginning of 2011, the United Nations has released a statement saying that there is no way to predict extreme weather conditions and that disaster losses will become the new normal. As extreme disasters gradually become the norm, we should shift our understanding of these incidents as natural disaster to man-made disasters. This fully illustrates the impact of man-made climate change on disasters. The United Nations has also urged all countries to face the issues with response plans in mind.

Mitigation and adaptation are currently the two main global strategies for combating climate change. Humans will not be able to reverse the trend of climate change in the short term, but we can slow down the pace of warming through mitigation of greenhouse gases. The impact of climate change on the art industry lies mainly in the difficulties of storage and preservation and the damage that extreme weather might cause. The threat of extreme weather is especially alarming. Proper adaptation strategies such as understanding the threats, taking the necessary mitigation measures, and utilizing various alert information. All of these can help to minimize the impact brought on by climate change.

Reference	Rainfall in 1 hour (mm)			Rainfall in 3 hour (mm)			Rainfall in 6 hour (mm)			Rainfall in 12.hour (mm)			Rainfall in 24 hour (mm)		
	Immediate	Level 2 Alert	Level 1 Alert	Immediate	Level 2 Alert	Level 1 Alert	Immediate	Level 2 Alert	Level 1 Alert	Immediate	Level 2 Alert	Level 1 Alert	Immediate	Level 2 Alert	Level 1 Alert
Gongguan	0	60	70	0	100	120	0	140	170	0	250	280	0	32	350
	[Daan district] alert zone: Daan district, Keelung Road Section 3, Changxing Street, Dunhua South Road Section 1, Daan Road Section 1, Zhongxiao East Road Section 4														
Civic Center	0	60	70	0	100	120	0	140	170	0	250	280	0	320	350
	[Daan district] alert zone: Daan district, Keelung Road Section 3, Changxing Street, Dunhua South Road Section 1, Daan Road Section 1, Zhongxiao East Road Section 4														

# 許文科

國立中央大學災害防治研究中心副研究員兼任執行秘書

## 現任

國立中央大學災害防治研究中心執行秘書

國立中央大學災害防治研究中心副研究員

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結構工程專業

## 專長領域

自然災害風險模擬

災害風險管理

地震工程



# Wenko HSU

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# Long-Sheng SHIH

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Currently serves as the Executive Director of Taiwan Art Gallery Association Taipei Art Economy Research Centre, Mr. Long-sheng SHIH specializes in the research regarding the environment and market of contemporary art. As the former secretary-general of Taiwan Art Gallery Association, he has participated in several project of Ministry of Culture on reports and researches about industrial observation, data collecting and policy suggestions.





# ±2°C X ART 的負經濟效應： 極端氣候對藝術產業的影響與因應對策

緊急處置：  
受損藝術品的緊急處置與修復要點

蔡舜任

TSJ 藝術修復工事主修復師暨負責人

## 一、前言

目前一般博物館、美術館及畫廊，大都採用水滅火系統因應火災時的突發狀況；為顧及滅火卻使藝術品及文物遭受不當水損的情形，館內必須謹慎規劃，預防火災或水損的搶救機制：

(一) 前期評估(災害發生後)：

1. 檢視登錄受災物現場環境。
2. 檢視登錄受災物受損情形。
3. 依文物置放處規劃搶救路線。

(二) 搶救作業流程制定：

1. 依受災物毀損程度，將搶救順序概分為四級：

(1) 紅：文物遭受極嚴重損傷—即載體及其上承載之材料構件嚴重會損，須立即搶修。

(2) 黃：載體或其上承載之材料構件嚴重損傷，可稍靜置後進行修復處理。

(3) 綠：載體及其上承載之材料構件輕微損傷，靜置後依順序進行修復處理。

(4) 白：無損傷，依現場狀況決定是否原址保留，或移至他處靜置保存。

2. 搶救用設備材料及人員編制：現場工作人員應

在災後立即成立搶救小組，依工作責任範圍區分，除拍照、記錄外，也需依受損文物數量分佈決定修復設備及材料的調度。館區內平時應準備緊急搶救材料箱(內含吸水紙、無酸不織布、紙鎮、小沙包、剪刀、鑷子、手術刀、各式羊毛刷、放大鏡、手電筒、無痕膠帶、夾鏈袋、水彩筆、紙板或壓克力板、小型風扇及吹風機，以及吸塵器)，可供平時管理或機動調度用。

(三) 緊急處置方式：

火災：

1. 現場狀況記錄。
2. 收集殘餘物，並維持物件完整。
3. 以各式光源攝影記錄。
4. 冷凍法。
5. 緊急送至修復處進行搶修。

水災：

1. 風乾法。
2. 真空抽氣法。
3. 冷凍法。
4. 真空冷凍乾燥法。

(四) 因場地及專業度限制，若處理中遇問題即停止動作，並請教修復或保存科學專家協助。

## 二、案例分享— L'alluvione di Firenze del 4 novembre 1966 (翡冷翠大水災)

以上為受損藝術品遇緊急狀況之搶救注意事項，筆

者亦當于講座時以 1966 年 11 月，發生於義大利翡冷翠（Firenze, Italia）市區的亞諾河河水暴漲事件為例，一夕間潰堤而出的大水自聖十字教堂（Chiesa di Santa Croce）附近的河岸挾帶大量爛泥砂石，瞬間奔流至城市各個角落。因為城中排水系統老舊不堪，無法因應這突如其來的天災，導致泥濘雜物和大量積水久久無法退散，整座城市淹沒在黃褐色的污水中。

歷史記錄，翡冷翠城中段的亞諾河，幾乎在每個世紀都曾發生過暴洪潰堤的案例，甚至早至文藝復興時期的達文西（Leonardo da Vinci）都曾試圖製作新式的分流閘，以解決水災對人民財產的威脅傷害。

然而，幾世紀下來的治水經歷，似乎也無法阻擋 1966 年這場繼十九世紀（3 Nov, 1844）水災後，規模最大的一次災害。

主要原因是當年十一月整月的驚人降雨量，據統計，單在十一月四日的 24 小時內，降雨量就達到 1900 多毫米（同一區的年平均降雨量為 921 毫米），亞諾河估計每秒流過 4000-4500 立方公尺的水量，因而使河水暴漲潰堤而出。

當時的大雨同樣為義大利中北部其他城市帶來嚴重的災情。

翡冷翠市區內的聖十字教堂（La Basilica di Santa Croce），因就位於河水潰堤處，於是大水直接湧入教堂內部，大量藝術收藏無一倖免。仍有許多展示當年水災災情的黑白老照片及影像，記錄了當時漂流木覆蓋教堂內外，廣場周遭災情慘重的模樣；教堂內建的博物館藝術收藏—尤以翡冷翠重要的文藝復興早期畫

家契馬布埃（Cimabue），於 1280 年左右用 Tempera 技法繪製的耶穌受釘刑十字架（Crocifisso），毀損程度最為嚴重，達總面積的 80%。雖然事後進行緊急的修復，卻仍無法恢復其水災前舊有原貌。

另外，珍藏於翡冷翠各處的大量文藝復興藝術珍寶及文化資產，同樣遭受前所未有的浩劫。城中所有低地處的建築或地下室皆遭泥濘吞噬；尤以國家圖書館（La Biblioteca Nazionale Centrale di Firenze）的倉庫中，成千上萬的書籍，包括珍貴手抄稿和罕見的早期印刷品，遭受嚴重的水損及髒污吸附；位於主教堂西向的洗禮堂，一組由吉貝堤（Lorenzo Ghiberti）於 1422 年耗時 21 年才完成的鑄銅大門—此門因鑄造工藝精美絕妙，讓一向吝於讚美他人作品的米開朗基羅敬稱為天堂之門—也被當時兇猛的大水沖開，大量雜物侵入洗禮堂，門上的十塊精細面板均嚴重毀損並長時間浸泡在污水中；義大利最重要的烏菲茲美術館（Galleria degli Uffizi），其中大量的文藝復興時期收藏，也同樣無法倖免。

四十多年後，筆者及當地的修復師仍持續修復當時遭受損害的藝術文物，可想見災情之慘重。

然而這場災難，卻促使翡冷翠成為孕育世界上最先進文物保存研究機構及修復學院的基地。

### 三、關於災後的緊急搶救訓練— Angeli di Fango（泥巴中的天使）

大水稍退後，來自義大利及全世界的自願者開始集結，快速進駐城中各個受損嚴重的災區，試圖搶修全

城尚浸泡於水中的珍貴藝術品和書籍，在最短時間內帶走嚴重淤積的的污泥，並親手留住這些歷經數百年歲月的歷史證詞。

這場在二十世紀首次出現不分國籍種族，令人難以置信的國際團結行動，儼然成為大水悲劇中最美麗的圖像。而這群來自世界各地的青年，因為救災而鎮日泡在黃泥爛土中搶救人類文明珍寶的群像，被稱作“泥巴天使”（Angeli di Fango）。

當時文物搶救修復的總指揮，是由當時翡冷翠硬石修復學院（Opificio delle Pietre Dure）的院長 Ugo Procacci 出任。他以超凡的遠見，先整齊了所有文物的修復技術水平，再配合尖端科技，讓修復工作能觸及的面相及研究範圍擴大。在如此困難的時局接下這般艱鉅的搶救修復工作，是因為他深知，只有面對非常艱難的修復狀況，才是二十世紀初萌芽的修復理論及方法論研究能一併前進的契機；他同時也是現代修復先驅中，少數能活用中世紀西奧菲勒斯長老的藝術總集（Teofilo monaco，1070 至 1125，藝術總集是彙整收集中世紀藝術及工匠技藝的專書）及錢尼尼（Cennino Cennini，1370 ~ 1440）的藝術之書 *il Libro dell'Arte*，尋找並確認古文物可能使用的材料、技法以及過程的證據，配合現代保存科學的觀念以及修復理論，提出更適合災後大批文物的修復執行標準。

於是 1966 至 1976 的十年之間，硬石修復學院開始在低地城堡（Fortezza da Basso）設立各式修復研究中心，積極展開研究及修復大批水損文物。當初來自世界各地的青年志願者，其中不乏文物修復專業人

士，因如是天災，而在短時間內面對大量不同文物的劣化問題，累積了驚人的修復經驗。

四十年後，這群人大都在各地的文化資產保存機構及修復領域，執掌了重要的決策及學術地位。

早年在硬石修復學院任職的 Gastone Tognaccini 教授，在 1978 年應聘擔任 Spinelli 宮—油畫類文物結構修護技術的教授（Laboratorio di restauro conservativo nel corso di Restauro Dipinti su tela e tavola），一待三十多年，目前已是一位七十多歲的長者，是文藝復興時期畫作保存修復技術的權威。

筆者將 Gastone 教授在 1966 年緊急搶救的聖十字教堂內嚴重毀損的 Cimabue 十字架為例，以及後續修復的許多重要畫作—如目前藏於碧提宮的卡拉瓦喬的沈睡天使、北方文藝復興大師提香的多幅作品、提也波洛及微洛內歇的巨幅油畫，還有低地三國知名畫家魯本斯等人的畫作等，探究如何在遭逢大水災或其他天災人禍的劇變後，以最適當的方式進行緊急搶救的過程，同時分享其嫻熟修復技巧，更能深刻體會修復這門行當，是唯有靠每日身體不懈怠的勞動，將理論化作執行技巧並滲透記憶的專業。



# Negative Economic Impacts of ( $\pm 2^{\circ}\text{C}$ ) X ART : Strategies for Art Industry Facing Climate Extremes

Emergency Response: Restoration Guidance for Damaged Artworks

**Shun-Jen TSAI**

Chief Conservator & Owner,  
TSJ Art Conservation & Restoration

## I. Preface

Museums, art museums, and galleries largely employ extinguishing systems when fighting fires. Meticulous planning goes into fire prevention and salvaging water damage in order to fight fires and minimize water damage to artwork.

### (1) Preliminary Evaluation (Post-Disaster)

1. Examine and record the environment of damaged artwork.
2. Examine and record the status of damaged artwork.
3. Map a route for salvage according to artifact placement.

### (2) Formulate salvaging processes:

1. Salvaging order will be divided into 4 tiers according to the extent of damage:

a. Red: Severe damage - the artifact and its components has suffered severe damage and requires immediate attention.

b. Yellow: the artifact and its components have suffered severe damage, but does not require immediate attention.

c. Green: the artifact and its components have little damage and is not a priority.

d. White: No damage, decision to keep artifact at original site or move to another location is dependent on circumstances.

2. Allocation of emergency response equipment and personnel: Staff members on site should form an emergency response task force and divide tasks according to responsibilities. Emergency response kits should be kept in the museum as a precaution. Contents should include water absorbent paper, acidic non-woven cloth, paperweights, small sandbags, scissors, pliers, surgical knives, a variety of wool brushes, magnifying glass, flashlight torch, seamless tape, ziploc bags, markers, cardboard or acrylic boards, small fans and blow dryers, and vacuums. The kits can also be used for regular maintenance and unscheduled dispatches.

### (3) Methods for emergency response:

#### Fire:

1. Record situation of the scene
2. Collect the debris and maintain integrity of the artifact
3. Make video recordings with different light sources
4. Freezing
5. Immediate delivery to restoration site for restoration

#### Water damage:

1. Air drying
2. Vacuum drying
3. Freezing
4. Vacuum freeze-drying

(4) If issues arise during the process due to the site or capacity, all actions should be stopped and





a restoration or preservation specialist should be consulted.

## **II. Case Study – L'alluvione di Firenze del 4 novembre 1966(1966 Flood of the Arno River)**

Listed above are reminders of processes during emergency response to salvage damaged artwork. The writer will use the the flood of the Arno River took place in November of 1966 in Florence, Italy as an example. A broken levee at the river near the Basilica of Santa Croce (Basilica di Santa Croce) brought an onslaught of mud on the city. The city's sewer system was too outdated to deal with the sudden disaster and was unable to drain the large amounts of mud and water. The entire city was steeped in water.

Historical records show that the Arno River overflowed almost every century. During the Renaissance, Leonardo da Vinci attempted to design a new floodgate to curb this threat and destruction to the people's wealth.

But several centuries of flood management could not stop the flood of 1966, the largest flood since the one on November 3, 1844.

The main reason behind the flood was the unprecedented amount of rainfall in November of that year. According to statistics, the amount of rainfall recorded in a 24 hour span on November 24 reached 1900 millimeters. (Average annual rainfall in the same area is 921 millimeters.) 4000-4500m<sup>3</sup> of water flowed through the Arno River every second, causing the levee to burst.

The massive rainfall also brought severe damage to other cities in northern and central Italy.

Basilica of Santa Croce, situated in the center of Florence, was in close proximity to the broken

levee. A large amount of water flooded the church and many pieces of artwork suffered damage. There are many black and white photos and videos of the flood that show the driftwood in and around the church and extent of the damage to the adjacent plaza. Damage to the collection of the museum built within church was extensive. This collection included the Crucifix (Crocifisso), a piece painted with the Tempera technique by Cimabue, an early Renaissance artist around 1280. The extent of damage covered 80% of the artwork's surface. Although emergency restoration happened after the fact, the water damage was irreversible.

Large amounts of Renaissance art and cultural heritage artifacts located around Florence could not escape devastation. Many low buildings and basements were overrun by mud. The storerooms at the Florence National Central Library (La Biblioteca Nazionale Centrale di Firenze), which contained thousands of volumes, were no exception. Rare manuscripts and early edition publications were water damaged and soiled. The Florence baptistry has a set of gilded bronze doors which took Lorenzo Ghiberti 21 years to construct. Completed in 1422, the craftsmanship on these doors were so superior that Michaelangelo, known for being frugal with his compliments, deemed them the "Gates to Paradise." Floodwaters broke through the doors and brought large amounts of debris into the baptistry. The 10 panels on the door were severely damaged and were soaked in wastewater for a long period of time. The prominent Uffizi Gallery (Galleria degli Uffizi) had a large Renaissance collection that did not escape the same fate.

40 years later, the writer and local restoration artists continue to work on the damaged artwork, exhibiting the severity of the disaster.

It is due to this disaster that prompted Florence to become the base for the world's leading research institutions on artifact preservation and restoration.

### III. Post-disaster emergency response training - Angeli di Fango (Mud Angels)

After the water receded, volunteers from all over Italy and the world gathered in cities devastated by the flood. They tried to salvage the precious art and books, remove the mud as fast as possible, preserve several centuries of historical testimony with their bare hands.

This instance of international cooperation that broke national barriers, the first of the 20th century, was a beautiful sight in the face of the tragedy. Young people from all around the world helped to save civilization's treasures and were called "Mud Angels" (Angeli di Fango).

The head coordinator of the emergency response operations was Ugo Procacci, the head of Opificio delle Pietre Dure (Workshop of semi-precious stones) in Florence. He used his extraordinary vision to consolidate techniques for restoration and paired it with leading technology to expand the scope of research in the field. Only due to his in-depth knowledge, was he able to take on the daunting task of restoration. This was the opportunity for restoration theory and methodology research, which had only recently appeared on the scene in the early 20th century, to progress simultaneously. He was also one of the few modern restoration pioneers who could utilize Theophilus Presbyter's (1070-1125) *Schedula diversarum artium* (List of various arts, which is a compilation of various medieval arts) and Cennino Cennini's (1370-1440) *il Libro dell'Arte* (The Craftsman's Handbook). He searched for and found materials, techniques, and processes that could be used on ancient artifacts and combined them with modern conservation science concepts and restoration theories. Thus, he proposed standards that were more appropriate for bulk post-disaster restoration.

In the decade from 1966 to 1976, Opificio

delle Pietre Dure established various restoration research centers at the Fortezza da Basso and actively carried out research and restoration on large quantities of water damaged art. There was no shortage of artifact restoration professionals among the young volunteers that came from all over the world. Due to the disaster and the amount of different problems with the artifacts, they were able to accumulate an astonishing amount of experience.

40 years later, these people work in cultural heritage preservation institutions and the restoration field, all holding important strategic and academic positions.

Professor Gastone Tognaccini started teaching at the Opificio delle Pietre Dure early on. In 1978, he was invited to teach restoration of oil paintings (Laboratorio di restauro conservativo nel corso di *Restauro Dipinti su tela e tavola*) at Palazzo Spinelli Firenze (Institute for Art and Restoration.) Now in his 70's, he has been there for more than 30 years and is an authoritative figure in the field of Renaissance art conservation and restoration.

After his emergency restoration of Cimabue's Crucifix at the Bastilla in 1066, Professor Tognaccini subsequently restored various famous paintings such as Caravaggio's *Sleeping Cupid* at Palazzo Pitti, many paintings by the Renaissance maestro Titian, massive paintings by Tiepolo, and paintings by the Low Countries' famous Reuben, etc. The writer wants to use these case studies to investigate which methods would be more appropriate for emergency response to a flood or other forms of natural disasters. Concurrently, the writer will also share restoration techniques in hopes that readers will come to experience that the art of restoration is achieved only through tireless hard work and committing to memory the practical skills that were based in theory.

# 蔡舜任

TSJ 藝術修復工事主修復師暨負責人

## 經歷

蔡舜任藝術修復工事，台灣

油畫及木構件彩繪文物主修復師 / 負責人

各式油畫及木構件彩繪修復，同時為公立及私人博物館典藏之油畫及廟宇彩繪物件，擔任審查顧問及修復執行者

國立台灣藝術大學古蹟藝術修護學系客座助理教授

木構件彩繪及油畫類藝術品修復實務教學；同時為公立及私人博物館典藏之油畫及廟宇彩繪物件，擔任技術顧問及修復工作執行者

Stichting Restauratie Atelier Limburg (SRAL),  
Maastricht, The Netherlands( 荷蘭 ) 油畫修復師

De Pont museum of contemporary art, Tilburg, The  
Netherlands( 荷蘭 )

藝術品修復師 ( 上海世博荷蘭館，中國 )

Studio of Restoration and Conservation - Stefano  
Scarpelli, Florence, ( 義大利 ) 油畫修復師

New Orleans Conservation Guild, INC., New Orleans,  
USA( 美國 )

油畫修復師

Studio of Restoration - Andrea Cipriani, Florence,  
Italy( 義大利 ) 油畫修復助理



# Shun-Jen TSAI

Chief Conservator & Owner, TSJ Art Conservation & Restoration

## Experience

· TSJ Art Conservation & Restoration Co., Ltd., Taiwan

Chief Conservator / Owner

· National Taiwan University of Arts, Taiwan

Visiting Assistant Professor/Dep. of Architecture Art Conservation

· De Pont museum of contemporary art, Tilburg, The Netherlands

Art Conservator, World Expo 2010/Dutch Pavilion, Shanghai, China

· Stichting Restauratie Atelier Limburg (SRAL), Maastricht, The Netherlands

· Practical Conservator

· Studio of Restoration and Conservation – Stefano Scarpelli, Florence, Italy

Painting Conservator

· New Orleans Conservation Guild, Inc., New Orleans, USA

Painting Conservator

· Studio of Restoration – Andrea Cipriani, Florence, Italy

· Assistant Conservator

# 謝佩霓

高雄市立美術館館長

## 專長及研究領域

作為藝評人，其曾數度應國際藝評人協會 (AICA) 之邀擔任世界年會主講人與評論人，其專論與譯作文章，散見於展覽專輯與雄獅美術、藝術貴族、山藝術、典藏藝術、藝術新聞、新觀念、現代詩、新朝藝術、藝術家、藝術觀點、藝術當代、北京師範大學藝術學報、世藝網、文化視窗、臺灣美術、筆匯、建築師、源、上海美術通訊、當代藝家之言…等中外文及期刊雜誌，另著有藝術家傳記與展示規劃設計專書數冊。

## 經歷

逢甲大學室內及景觀設計系、建築系助理教授、中國時報特約策展人、劉其偉基金會董事、香港亞洲藝術文獻庫顧問、中國藝術當代雜誌、藝術新聞 CANS 藝術雜誌特約撰述等職。曾任逢甲大學藝術中心主任、國立台南藝術大學造型藝術研究所助理教授、國立台灣美術館副編審兼公關室主任、南非大學國際比較政治研究松薪亞洲研究專員，亦曾執教於靜宜大學人文科、中山醫學院共同科。

曾於台灣、美國、比利時、南非等地求學、就業、執教，研究領域包括英美文學、藝術社會學、空間美學、公共藝術及當代藝術。作為策展人，其曾應美國新聞總署 (USIA) 邀請赴美考察各大美術館及基金會，而應聘於國內外策劃及參與之國際展、研究展及雙年展，已逾數十項。

# Pei-ni Beatrice HSIEH

Director, Kaohsiung Museum of Fine Arts

Born in Taichung, Taiwan in 1966, Pei-ni Beatrice Hsieh is currently the director of the Kaohsiung Museum of Fine Arts. She is also appointed as the committee member for various councils on both municipal and national levels in Taiwan.

Educated in Taiwan, United States, Belgium and South Africa, Hsieh was initiated into fields of English literature (B. A., Providence University & Diploma in TEFL, University of Pennsylvania), sociology of arts (M. A. in European Studies, Katholiek Universteit Leuven), aesthetics and contemporary arts (D.E.A., Candidate for D.Phil., Stellenbosch University). Her research interests are therefore versatile to include critical theories, gender studies, cross-cultural & inter-disciplinary studies, public arts, art managements & cultural policies.

As an art curator, Hsieh was the chief curator of the National Taiwan Museum of Arts, and was also the Chief of its Office for International & Public Relations. In her curatorial practices, Hsieh has been credited with dozens of local and international exhibitions held in leading art institutes in Asia, America, Europe and Scandinavia. Among those

exhibitions, there are retrospectives devoted to overseas Chinese maestros and major biennials held in Venezia, Lyon, Shanghai and Istanbul. She was best known for presenting the Taiwan Pavilion at the Venice Architecture Biennial, the very first move to make the Chinese contemporary architecture seen in the international arena. Associate with Johnson Zhang, she helped to realize the first Hong Kong Pavilion to participate in the Venice Visual Arts Biennial. Meanwhile, she is preparing for projects to tour the exclusive oeuvres of Amadeo Modigliani in Asia.

As an art critic, Hsieh has constantly published essays and articles in periodicals, magazines and catalogues in Chinese and foreign languages in the last two decades. As an art historian, Hsieh specializes in the history of the modernization of Chinese visual arts. She is author of several artists' biographies, including the award-winning pieces, and books featuring exhibition planning and design. Hsieh has been invited by AICA for several times to deliver keynote speeches at its annual conferences. She was also the recipient of the research grant of USIA.



# 建立藝術與商業交叉創新的橋樑

**喬凡尼 史基馬**

倫敦藝術大學藝術管理教授與創新思考力中心執行長



就傳統觀點而言，商業與藝術間的關係就像單行道：商業組織會背書、金援，或宣傳藝術品，但藝術卻無法帶給商業什麼。不過 Giovanni Schiuma 教授指出，藝術是一項強而有力的工具，這個工具能讓管理者提升組織的價值創造空間，以及激勵商業表現。在

以藝術為主軸的前提下，藝術可以隨著勞動力與公共設施的增加而與時俱進，終將會創造出好的價值。Giovanni 進一步闡釋藝術為 21 世紀組織發展所帶來的策略性考量與貢獻，在一個組織中，他將藝術定位於資源管理、組織發展源頭與創新管理之間。





# Bridging Arts and Business for Cross-Innovation

**Giovanni SCHIUMA**

Director, Innovation Insights Hub,  
Central Saint Martins College of Arts and Design, UAL



The traditional view of the relationship between business and the arts is very much a one-way affair: organizations may endorse, fund or publicise the arts but the arts have nothing to offer from a business perspective. Professor Giovanni Schiuma claims that the arts represent a powerful means by which management can enhance organisational value creation capacity and boost business performance. In the forms of Arts-Based Initiatives (ABIs), the arts can be employed and deployed

for developing workforce and organisational infrastructure that can drive in turn superior value creation. Giovanni explains the strategic relevance and contribution that the arts can offer for the development of twenty-first century organizations. He situates the arts in organizations among the management resources and sources for organizational development and management innovation.

# 喬凡尼 史基馬

倫敦藝術大學藝術管理教授與創新思考力中心執行長

喬凡尼 史基馬博士身兼倫敦藝術大學藝術管理教授與創新思考力中心執行長，他以藝術中的商業與策略知識管理專家載譽全球，與其廣泛的管理專業與整合研究團隊與企畫案的優異能力，他同時也是講師與教育推動者。他的創造力與創新能力結合了國際視野與包容的胸襟，使他能提出關鍵性的策略研究及解決組織中的挑戰。

喬凡尼以兩本著作為名，一是關於藝術在商業中的應用，二是關於對知識財產的估算及管理，此外，他的《藝術的商業價值》“The Value of Arts for Business”更被稱為必讀教科書，書中討論在以藝術為主軸的形式下，藝術如何能轉換成商業模型。喬凡尼在全世界許多學校擁有客座教授一職，也為歐亞及中東的私人機構與政府組織提供系統性的輔助。他定期在國際性的活動上演講。

喬凡尼擁有羅馬第二大學商管博士學位，掛名作者或共同作者的出版品共有 180 件，其中包含了書籍、文章、研究報告，和關於策略知識財產與智慧資本管理、策略經營績效與管理、創新系統、創新管理，以及組織發展等主題的研究白皮書。他身兼期刊「知識管理研究與實踐」[“Knowledge Management Research and Practice”]的總編輯，與國際期刊「卓越業務考核」[“Measuring Business Excellence”]的共同主編，同時也是知識管理期刊、智慧資本期刊、知識發展國際期刊，及學問與智慧資本期刊的客座編輯。現任知識資產力國際研討會 (International Forum on Knowledge Assets Dynamics) 主席。



# Giovanni SCHIUMA

Director, Innovation Insights Hub, Central Saint Martins College of Arts and Design, UAL

Dr Giovanni Schiuma is Professor of Arts based Management and Director of the Innovation Insights Hub at University of the Arts London. He is widely recognized as one of the world's leading experts in the arts in business and strategic knowledge management. Inspiring speaker and facilitator, with extensive research management expertise and excellent ability to coordinate complex projects and lead research teams. Creative and innovative, with international mind-set and openness to address and solve key strategic research and organisational challenges.

Giovanni is widely renowned for his work on the use of the arts for business, as well as his work on assessing and managing knowledge assets. His recent book "The Value of Arts for Business" by Cambridge University Press is regarded as a seminal text on how the arts, in the form of Arts-based Initiatives (ABIs), can transform business models. Giovanni also holds Visiting Professorships position around the world. He provides scientific support to private corporations and government organizations in Europe, Asia and the Middle East. He regularly deliver keynote presentations for international events and teach executive seminars.

Giovanni has a Ph.D. in business management from the University of Rome Tor Vergata (Italy) and has authored or co-authored more than 180 publications, including books, articles, research reports and white papers on a range of research topics particularly embracing Strategic Knowledge Asset and Intellectual Capital Management, Strategic Performance Measurement and Management, Innovation Systems, Innovation management and Organisational Development. He serves as Chief-Editor of the journal "Knowledge Management Research and Practice" and as Co-Editor in Chief of the international journal "Measuring Business Excellence" and he has acted as guest Editor of the Journal of Knowledge Management, Journal of Intellectual Capital, International Journal of Knowledge-based Development, and Journal of Learning and Intellectual Capital. Giovanni chairs the International Forum on Knowledge Assets Dynamics.



# 亞洲收藏家

王薇

龍美術館創辦人

龍美術館創辦人王薇女士，龍美術館以其私人收藏為基礎，紮根本土文化的同時，也注重古今藝術、東西方文化的對比展示與研究。作為國際知名的收藏家，劉益謙、王薇的收藏涵蓋了中國傳統藝術、現當代藝術，以及亞洲和歐美的當代藝術等各種類別。



# Asian Collectors

**Wei WANG**

Founder, Long Museum

Ms. Wei Wang is the founder of Long Museum. Long Museum uses their private collections as a starting point, places great emphasis on research and contrasting exhibitions of both old and new, Western and Eastern, while being deeply rooted in local culture. As well-known international collectors, Wei Wang's collections encompasses a broad range, includes pieces of traditional Chinese art, modern and contemporary art, and Asian and European contemporary art.



# 陸潔民

中華民國畫廊協會資深顧問

陸潔民於 1989 年四月在美國加州舊金山南灣矽谷高科技工業區巧遇北京畫院畫家趙秀煥老師，因而調動他心中對藝術有興趣的老靈魂，從科技領域跨到藝術界，開始了他的跳 Tone 人生。曾任台灣畫廊協會秘書長，籌辦連續三屆的台北國際藝術博覽會，現任台灣畫廊協會資深顧問、上海藝術博覽會顧問、北京藝術博覽會顧問、北京中央美術學院客座教授、IC 之音『藝術 ABC』節目主持人並出版「藝術 ABC」有

聲書，他也是上海泓盛拍賣公司顧問、台灣中誠、金仕發藝術品拍賣公司拍賣官。每年積極地參加世界各地的藝術博覽會和藝術活動，使得他擁有廣闊的視野與縝密的觀察力，國際化的藝術投資、亞洲藝術市場的剖析、拍賣市場觀察、藝術博覽會的發展現況、畫廊的經營模式、藝術家與市場供需等，都是他研究的面向，他也不斷以此為藝術市場穩健發展的目標而努力。

# Jimmy LU

Consultant, Taiwan Art Gallery Association

Jimmy Lu used to be the secretary general of Art Gallery Association R.O.C. Taiwan. He assisted in organizing three consecutive Art Taipei fairs, and he is currently the senior consultant of Art Gallery Association R.O.C. Taiwan. Meanwhile, he is the consultant of Shanghai Art Fair and Hosane auction house in Shanghai. He is also the visiting scholar of the Central Academy of Fine Arts in Beijing, and the host of “Art ABC” on the IC Broadcasting Co. FM97.5. Mr. Lu, who is possessed of multiple job titles, is one of the few people working in the art

industry with science and engineering degree. He actively participates in art expositions and artistic activities worldwide, which has broaden his vision and rendered him meticulous observation skills. He has been studying on international art investment, the analysis of Asian art market, development of art expositions, operation of art galleries, supply and demand of artists and market, ...etc. He is also dedicated to achieving the goal of a steady development of the art market.





# 亞洲價值： 亞洲藝術市場的整合與競爭

**張學孔**

中華民國畫廊協會前理事長

**程昕東**

北京畫廊協會會長

**Anna PAPPAS**

澳洲商業藝廊協會 理事長

# 張學孔

前中華民國畫廊協會理事長

新苑藝術負責人

中華民國畫廊協會理事長 (2011-2012)

台灣當代藝術連線創辦人

PHOTO TAIPEI 創辦人

台北藝術論壇召集人 (2009-2010)

# 程昕東

北京畫廊協會會長

程昕東為程昕東國際當代藝術空間的創辦人。程昕東國際當代藝術空間 2000 年成立於北京（中國）。在中國與世界各國之間建立了一座文化的橋樑。其作用是在東西方當代藝術中斷半個世紀的交流之後，通過在中國舉辦中國與國際當代藝術家的展覽，為中國大眾提供了開闊視野的機會，在很大的程度上拓展了大眾對當代藝術的鑑賞力。

除了在中國舉辦當代藝術家的展覽外，在中國以外的世界各國城市，程昕東也引領西方公眾去發現和欣賞來自中國的當代藝術，在國際藝術圈獲得廣泛的讚譽。在過去的兩年裡，程昕東在北京建立了兩個新藝術空間（程昕東國際當代藝術空間 II 和程昕東國際當代藝術空間 III），使它成為了北京最重要的畫廊之一。程昕東現任北京畫廊協會會長。

# Anna PAPPAS

澳洲商業藝廊協會 理事長

## 經歷

Anna Pappas Gallery 執行長

2003- 至今

執行整個畫廊的運作、計畫、藝術家、國際和當地的活動、招募及員工訓練，同時也擔任澳洲商業藝廊協會之理事長。

澳大利亞管理研究所 高階管理培訓課程 行銷總監

2000年2月 -2002年2月

負責管理碩士在職專班及企業管理碩士的管理計畫執行

澳大利亞經營管理學會 行銷總監

1995年11月 -1999年12月

企業管理訓練及行銷計畫之行銷專案企畫

## 學歷

墨爾本大學

藝術史藝術鑑賞與保存學系 2006-2007

澳洲雪梨科技大學

碩士，國際行銷管理學系

1999-2002

澳洲皇家墨爾本理工大學

碩士，行銷管理學系

1996-1999



# 張逸群

中華民國畫廊協會理事長

傳承藝術中心負責人曾任中華電視台 - 華視新聞雜誌 - 執行製作、錦繡河山 - 執行製作、早安今天 - 總執行製作。公共電視 - 天涯若比鄰 - 執行製作、放眼看天下 - 執行製作、畫我故鄉 - 製作人。







# Asian Value : The Coopetition of Art Market in Asia

## **Richard CHANG**

Former Chairman, Taiwan Art Gallery Association

## **Xin-Dong CHENG**

President, Art Gallery Association, Beijing, China

## **Anna PAPPAS**

President, Australian Commercial Galleries Association



# Richard CHANG

Former Chairman, Taiwan Art Gallery Association

Director, Galerie Grand Siecle

Chairman, Taiwan Art Gallery Association  
(2011-2012)

Founder, Taiwan Contemporary Art Link

Founder, PHOTO TAIPEI

Convener, Art Taipei Forum (2009-2010)



# Xin-Dong CHENG

President, Art Gallery Association, Beijing, China

Xin Dong CHENG is the founder and director of the Xing Dong Chen Space for Contemporary Art. Xin Dong Cheng Space for Contemporary Art was founded in the year 2000 in Beijing, China. Xin Dong Cheng's aim is to establish a cultural bridge between China and the rest of the world. By exhibiting Chinese and western artists in China, Xin Dong Cheng gives the Chinese public an opportunity – after half a century of interruption – to broaden their knowledge of modern and contemporary art from the west.

By holding exhibitions of Chinese and western artists at his galleries in China and abroad, Xin Dong Cheng also leads the western public towards a fresh discovery and appreciation of Chinese contemporary art, already widely appreciated in international art circles. In the past three years he has opened two new gallery spaces in Beijing (XDC Space II and XDC Space III), making it one of the largest and most important galleries in the Chinese capital. Now he is the president of Art Gallery Association, Beijing, China.

# Anna PAPPAS

President, Australian Commercial Galleries Association

## Experience

Director

Anna Pappas Gallery

2003 – Present (11 years)

Direct the entire Gallery, its programs, artists, international and local events, recruit and train staff and sit at ACGA Board, as National President.

Marketing Director, Executive Education

AGSM Executive Programs

February 2000 – February 2002 (2 years 1 month)  
Sydney, Australia

Director of Marketing for the entire suite of Management programs, EMBA's and MBAs.

Marketing Director, Executive Programs

AIM (Australian Institute of Management)

November 1995 – December 1999 (4 years 2 months)  
Melbourne, Australia

Marketing and Communications specialist for the suite of executive programs and management training.

## Education

Melbourne University

Art History, Criticism and Conservation

2006 – 2007

University of Technology, Sydney

Masters, International Marketing

1999 – 2002

RMIT University

Master's degree, Marketing

1996 – 1999



# Yih-Chyun CHANG

Taiwan Art Gallery Association

Director of Chuan Cheng Art Center  
Chairman of Taiwan Art Gallery Association

## Experience

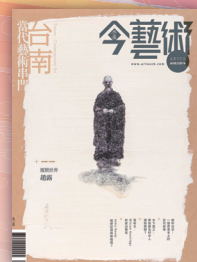
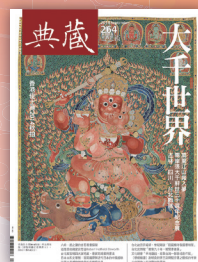
Executive Producer of CTS newsmagazine, Chinese Television System

Executive Producer of Taiwan Public Television



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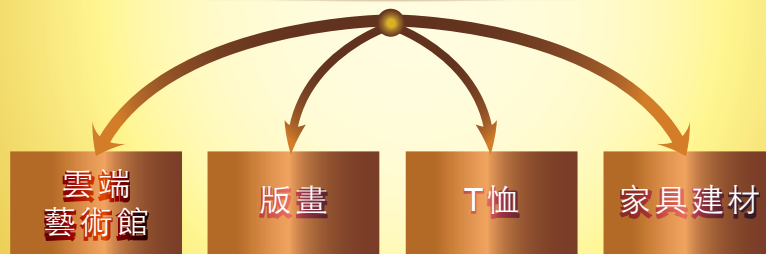
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亞洲當代藝術風起雲湧

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