出國報告（出國類別：其他）

第40屆國際海龜研討會（ISTS40）報告
（視訊報告）

服務機關：海洋委員會海洋保育署
姓名職稱：郭庭羽科長、陳玉婷技士、蔡雅如技士
派赴國家/地區：臺灣, 中華民國
出國期間：111 年 3 月 25 日至 3 月 28 日
報告日期：111 年 6 月 27 日

摘要

第 40 屆國際海龜研討會（ISTS40）由國際海龜協會（International Sea Turtle Society, ISTS）召開，於 111 年 3 月 25 至 28 日在澳洲珀斯召開線上視訊會議，其中 3 月 25 日為會前工作坊（需另付費參與），111 年 3 月 26 日開幕，後續包含主題演講及海報展示等。海龜在臺灣皆被列為保育類動物，其中綠蠵龜、玳瑁、赤蠵龜、欖蠵龜及革龜等 5 種在臺灣周邊海域皆有分布，臺灣周邊海域為海龜的覓食棲地或洄游中繼站，某些離島沙灘則為綠蠵龜的產卵棲地。本署持續推動海龜生殖生態學調查、擱淺海龜處理及產卵母龜洄游路徑研究等保育工作，本次主要參與第 40 屆國際海龜研討會（ISTS40）的主題演講，以了解創新知識及技術、國際保育趨勢及策略等，以作為未來保育方針及政策擬定之參考或依據。

3 月 26 日首先由國際海龜協會（ISTS）時任主席 Kellie Pendoley 進行開幕致詞，Kellie Pendoley 從 1980 年代就注意到海龜保育的議題，並積極投入並成立工作團隊，也因此認識了許多相關機構及民間組織，進而在本次會議邀請到許多合作夥伴共襄盛舉，包含 Fortescue Future Industries（FFI）的首席海洋環境顧問 Abigail Ross、西北岸平背龜保育計畫（NWSFTCP）的首席研究員兼協調員 Dr. Scott Whiting、澳洲當地的原住民領袖、環境顧問及社會情感福利官 Albert Wiggan 等 3 位主講者，分享能源轉型對保護生物多樣性及減緩氣候變遷的重要性、環境影響評估及生物多樣性補償（offsets）的觀念及案例、與原住民利益相關者的合作並建立關係等。

主題演講由來自全球各地的學術單位研究人員、專家學者、環保組織及在地民間團體等，針對海龜解剖生理學、水下及產卵行為、族群監測、漁業威脅、保育策略、教育宣導、社會/經濟及文化研究等主題進行分享與討論。此外會議中多次強調跨單位或領域的合作，以及長期保育計畫的成功，需要建立與當地利害關係者良好的關係，我國同樣面臨許多類似的議題，可作為後續推動相關保育行動之參考，並因地制宜配合環境現況及風俗文化等進行調整。

國際會議除了分享新技術及研究成果外，也是結識合作單位、了解最新研究並討論問題解決方式的極佳機會，透過建立夥伴關係可以對未來產生更大的影響，依據官方統計本次研討會共有來自 83 個國家的生物學家、民間團體、教育家及政策擬定者等共約 600 多人共同參與，為國際海龜保育重要交流平台及合作網絡，有助於本署瞭解全球海龜保育趨勢及成果，相關資訊亦利於後續海龜保育政策及保育計畫訂定。

目錄

壹、目的

國際海龜協會（International Sea Turtle Society, ISTS）為成立於 1996 年的非營利組織，每年召開一次國際海龜研討會，早期主要以美國的保育活動為主，發展至今已聚集來自世界各地的生物學家、保護主義者、教育家及倡議者，共同分享相關保育知識及技術，並建立網絡及合作關係，進一步培訓未來的海龜生物學家及保護主義者，相關研究成果分享亦可作為各國政府、國際保育組織及世界各地相關團體的保育策略參考，近十年來研討會內容已擴及社會科學、教育及基層保育工作。

第 40 屆國際海龜研討會（ISTS40）原訂於 109 年召開，因 COVID-19 疫情多次延期，最後決定於 111 年 3 月 25 至 28 日在澳洲珀斯召開線上視訊會議，內容包含會前工作坊（需另付費參與）、主題演講及海報展示等，並分為八大主題如下：

1. 解剖、生理及健康（Anatomy, Physiology and Health）
2. 水下生物學－行為、生態、遷徙、遙測及覓食

   （In-water Biology －Behaviour, Ecology, Migration, Telemetry, and Foraging）
3. 產卵生物學－生態、行為及繁殖成效

   Nesting Biology （Ecology, Behaviour, and Reproductive Success）
4. 族群生物學及監測－族群狀態及模式、遺傳學、產卵及水下族群趨勢

   Population Biology and Monitoring－Status, Modelling, Demography, Genetics, Nesting Trends, and In-Water Trends
5. 漁業及威脅（Fisheries and Threats）
6. 保育、管理及政策（Conservation, Management and Policy）
7. 教育、推廣及宣傳（Education, Outreach, and Advocacy）
8. 社會、經濟及文化研究（Social, Economic, and Cultural Studies）

全球現存 7 種海龜皆為 CITES 附錄一物種，在臺灣皆被列為保育類動物，其中綠蠵龜、玳瑁、赤蠵龜、欖蠵龜及革龜等 5 種在臺灣周邊海域皆有分布，臺灣周邊海域為海龜的覓食棲地或洄游中繼站，某些離島沙灘（如蘭嶼、澎湖、東沙及南沙）則為綠蠵龜的產卵棲地。海龜受到的主要威脅包括漁業混獲、棲地破壞、海洋廢棄物及其他人為威脅等，為確保其能存續於自然環境中，本署持續推動海龜生殖生態學調查、擱淺海龜處理及產卵母龜洄游路徑研究等保育工作，本次主要參與第 40 屆國際海龜研討會（ISTS40）的主題演講，以了解創新知識及技術、國際保育趨勢及策略等，以作為未來保育方針及政策擬定之參考或依據。

貳、過程

本署參與第 40 屆國際海龜研討會（ISTS40）的開幕及特邀講座、主題演講、閉幕及頒獎（議程詳如附錄一），本次線上會議採用「Gather Town」視訊軟體，空間創建者可依人數及需求創建大廳、會議室及海報室，布置攤位及桌椅等，與會者可設定自己的角色並前往不同場所參加活動，使用鍵盤各按鍵即可進入會議、瀏覽簡報及發表演講等，並透過視訊鏡頭及麥克風與空間中的其他人進行互動（與會空間截圖詳如附錄二，ISTS40 整體執行計畫詳如附錄三）。

一、 開幕及特邀講座（Opening Remarks and Keynote Presentations）

3 月 26 日首先由國際海龜協會（ISTS）時任主席 Kellie Pendoley 進行開幕致詞，在 2019 年第 39 屆國際海龜研討會（ISTS39）結束後，2020 年因為 COVID-19 疫情取消了當年度的研討會，並於去年決定 2022 年在澳洲珀斯舉辦線上會議，感謝所有工作人員、相關單位及各位與會者們的支持，疫情的發生雖然造成了不可預期的影響，但也不失為一個機會，可以藉此將協會網頁及研討會軟體等進行更新與整合。Kellie Pendoley 從 1980 年代就注意到海龜保育的議題，並積極投入並成立工作團隊，也因此認識了許多相關機構及民間組織，進而在本次會議邀請到許多合作夥伴共襄盛舉。

接著由Warrang-Bridil（澳洲當地的一家原住民文化旅遊和諮詢公司）的擁有及經營者 Mervyn (Nick) Abraham，歡迎各位參與本屆在澳洲舉辦的海龜研討會，在澳洲不少原住民都與海龜有密切的關係，原住民自己有著一套與自然共存的生活方式，在以前多透過口耳相傳甚至親身體驗的方式，來傳播知識及觀念。現資訊傳播迅速的年代，有更多的方式用來傳遞知識並採取行動，帶來了許多便利，但也為自然環境及傳統文化帶來了破壞。希望大家能先多了解自己的故鄉，也多認識各地的文化，正視這些傳統對當地的意義，才能制定出因地制宜的新秩序。

接下來由 3 位特邀講座分享相關工作經驗及想法，首位主講者 Abigail Ross 是 Fortescue Future Industries（FFI，一家全球性的綠色能源公司）的首席海洋環境顧問，講述能源轉型對保護生物多樣性及減緩氣候變遷的重要性，以及如何在工業上減少碳排放。FFI 致力於從 100%再生能源中生產零碳排放的綠色氫（green hydrogen）及綠色氨（green amminia）， 氫可作為電動車的電池原料、船運、航空及工業的替代燃料、製作農業用綠肥等，透過電解軟性水來生產，電解過程中所需的電力，若為使用再生能源（如太陽能、風力、水力或地熱發電等），達成零二氧化碳排放時，產出的即為綠色氫。FFI 是 2021 年舉辦的第 26 屆聯合國氣候變遷大會（COP26）上成立的先行者聯盟（First Movers Coalition）創始成員，必須開發新技術以加速達成實現《巴黎協定》及《聯合國氣候變化框架公約》的目標。

第 2 位主講者 Dr. Scott Whiting 是西北岸平背龜保育計畫（North West Shelf Flatback Turtle Conservation Program，NWSFTCP）的首席研究員兼協調員，NWSFTCP 是西澳政府的生物多樣性及地景保護單位。Dr. Scott Whiting 分享了一些環境影響評估及環境/生物多樣性補償（offsets）的觀念及案例如下：

1. 環境/生物多樣性補償：1970 年代首先於美國溼地保育出現的觀念，包含環境影響評估、減輕及復育措施等，由公司或支持者提供資金或行動，以補償特定活動對環境造成的影響，可分為 1) 直接補償：棲息復育、避免未來的破壞（設置保護海洋保護區、執行威脅減輕措施等）；2) 間接補償：增加相關基礎知識（研究、監測）或教育宣導；3) 自願補償：通常由倡議者或公司在沒有補償法規的國家中自願提出。
2. 西北岸平背龜保育計畫（NWSFTCP）：巴羅島上有一家大型液化天然氣工廠，距離平背龜的產卵沙灘海灘不到 100 公尺，該沙灘是澳洲最大的平背龜棲地之一，因此該工廠需要在 60 年內提供州政府共 6250 萬美元（每年約 100 多萬元）的環境補償經費，用於平背龜保育、監測研究、威脅減輕措施及教育宣導等。
3. 海龜保育行動：首先應建立救援系統及訂定基本步驟，藉由教育訓練培養優良的工作人員及管理階層，了解相關政策、全球經濟及海龜生物學等，尋求合作夥伴及資金，並與利害關係人進行溝通及教育宣導，透過多方討論改善現況。
4. 結論：環境補償仍是一項有爭議的行動，可能超過政府的一般支出且難以評估成效，但長遠的來說，海龜作為生態指標物種之一是必須被保護的，且保育計畫應有長遠的規劃，包括之後缺乏資金或失去原執行單位時的規劃，例如留下系統性的資料及標準作業流程等。

第 3 位主講者 Albert Wiggan 是澳洲當地的原住民領袖、環境顧問及社會情感福利官，介紹了他的故鄉金伯利（Kimberley），是一處與海龜共同成長的地區，以前人們會食用海龜，但也有一套與自然共存的方式，現在的情況不同，有需多需要深度探討的問題，例如久居於海岸的原住民與一般民眾認知上的不同。Albert Wiggan 作為原住民領袖及環境顧問，直接參與並負責監督金伯利的海洋研究計畫，現在許多海洋研究都擴及到了傳統民族國家，通常由利益相關者資助並有著各種目的，因此與原住民利益相關者的合作並建立關係十分重要，且必須顧及傳統文化在精神層面的影響，除了生物學方面，如何溝通並達成共識更是必須努力的方向。

二、主題演講（Session）

主題 1：解剖、生理及健康

針對海龜生理及形態等各方面進行研究，並探討個體及群體的健康與環境的關係，包含解剖學、生理學、生殖學、體溫及滲透壓調節、功能形態學、疾病、獸醫護理、附生物、寄生蟲、健康評估、胚胎學及病理學等，以科學的方式進行研究並分享新方法、技術及分析結果。

專題 1：透過監測綠蠵龜血中荷爾蒙濃度預測其交配及產卵行為／Plasma Hormone Levels in the Green Turtle *Chelonia Mydas* Reared under Captivity as a Tool to Predict mating and Oviposition

以色列海龜育種小組利用 23 隻人工飼養的母綠蠵龜，2017-2020 年間以每年的 6 月至個年 5 月為一個週期，進行血檢、型態測量及超音波觀察產卵期與前後的變化，結果顯示血液中的睪固酮及 GGT 濃度可作為母龜即將產卵的指標，甚至可在產卵前 6-7 個月（即前一年的 11 月）進行預測，使用簡單的採血方式即可獲取大量的數據。本研究可提供未來選擇進行交配的公母龜之參考，例如於母龜即將產卵前挑選健康的雄龜進行交配，以維持族群的基因多樣性，本研究的成功可引領更多的圈養繁殖計畫。

專題 2：在斯里蘭卡被移位的綠蠵龜卵窩中胚胎死亡、畸形及發育階段之研究／Developmental Stages and Congenital Malformations of Dead Embryos and Hatchlings in Hatchery Relocated Clutches of Green Turtles (*Chelonia mydas*) in Sri Lanka

在斯里蘭卡設置了許多以保育為目的孵化場，為研究孵化場的孵化成功率及觀察胚胎發育過程及畸胎情形，本研究收集了 2016 年 3 月至 2017 年 6 月的 30 個窩卵共 1748 顆卵，平均孵化成功率為 90%（73.7-100%），其中 161 顆孵化失敗的龜卵被剖開並進行胚胎期判定。

在 15 個被記錄的畸形胚胎中，20%為白化症（色素沉著減少），可存活至成年且具繁殖能力，但健康度可能較差；6.6%為獨眼或無眼畸形；最常見的畸形發生於背甲（73%），其中 46.6%為發育不良、13.3%為過度發育、6.6%為背甲凹陷、6.6%為骨架發育不良，背甲畸形在稚龜較成龜常見，推測可能對存活率有所影響但仍未經證實，造成背甲異常的可能原因包含基因遺傳、高溫及過度乾燥等。

本研究是斯里蘭卡第一個針對胚胎發育及先天畸形的研究，結果顯示綠蠵龜在胚胎發育的早期及晚期有較高的死亡率，高比例的背甲畸形需要持續監測並改善卵窩溫度過高的問題，未來可進一步針對龜卵的親緣性進行研究，以比較任何可能造成胚胎畸形的原因。

專題 3：馬來西亞登州的野外產卵海龜的血液學、氣體分析及生化數據／Hematology, Blood Gases and Biochemistry Profiles of Wild-nesting Sea Turtles in Terengganu, Malaysia

本研究持續收集野外產卵海龜進行血液學檢查、血液氣體分析及生化學檢查，以及型態測量、外觀及健康度評估等生理學檢查，並經過溫度校正，以建立海龜的臨床病理學數值的參考範圍（reference ranges/intervals，RIs）。其他國家也做過類似研究，例如在澳洲及南美的覓食族群、在臺灣及印尼康復野放的海龜，馬來西亞先前也研究過產卵母龜但數據仍缺乏。建立參考範圍（RIs）甚至進一步發展建線上即時查詢的資料庫，可藉由監測生理變化保護海龜族群並精進保育管理策略。

專題 4：烏拉圭海岸綠蠵龜小核紅血球的調查評估／Evaluation of the Presence of Micronuclei in Erythrocytes of Green Turtles (*Chelonia mydas* Linneaus, 1758) from the Uruguay Coast

小核紅血球為暴露於基因毒性物質引起的染色體變異所致，常被用來評估動物健康度及環境品質，綠蠵龜為重要的生態指標物種之一，本研究於 2017 年收集 20 隻綠蠵龜進行採血檢查，結果平均小核率（Micronuclei frequency，MNF）為每 1000 顆紅血球中有 13.62±8.68 顆小核紅血球，且與海龜的年齡及體型無關聯性，推測小核率（MNF）的增加與區域汙染有關，但在統計學上並無顯著差異，可能因重複性低，或與棲地利用方式及海龜極大的活動範圍有關，此外小核紅血球的出現率可能與污染源的規模及距離有關。

專題 5：首次以非侵入性方式監測赤蠵龜產卵期間的心律不整／First Record of Arrhythmia Associated with Oviposition Revealed by Non-invasive Heart Rate Monitoring of Gravid Loggerhead Turtle

心電圖（Electrocardiography，ECG）記錄器有嵌入式及貼附式 2 種，嵌入式的優點為訊號清晰，缺點為侵入式且容易造成緊迫；貼附式的優點為非侵入性且操作簡單，但訊號較不清晰，本研究以非侵入性方式監測赤蠵龜產卵期間的心率，包含挖卵窩、產卵及覆沙等，發現母龜在產卵時會有心律不整的現象，母馬在生產前後及鉤吻鮭產卵時也有類似的情形，屬於副交感神經系統為主的反射，顯示非侵入性的心電圖記錄器可用於監測海龜產卵期間的心率。

專題 6：海龜健康基準：支持西澳大利亞的保育科學／Sea Turtle Health Baselines: Supporting Conservation Science in Western Australia

本研究為首篇平背龜臨床病理學參考值（RIs）、檢測出新 *Haemocystidium* 屬瘧原蟲、首篇西澳大利亞的海龜擱淺基礎資料、首例平背龜 Spirorchiidae 科住血吸蟲感染病例、首次從爬蟲類分離出魚型鏈球菌（*Streptococcus iniae*）等。

基礎健康評估樣本來自產卵族群 148 隻及覓食族群 50 隻，進行外觀檢查、臨床病理學診斷（例如血檢）及建立數值參考範圍（RIs），並檢查血液寄生蟲（基因定

序、光學或電子顯微鏡檢查），於平背龜及綠蠵龜覓食族群中檢出新 *Haemocystidium* 屬瘧原蟲但盛行率低。

疾病研究樣本來自 75 隻擱淺海龜，活體來自珀斯動物園病例及診斷工作坊，死亡案例進行剖檢及額外診斷，額外診斷包含組織病理、寄生蟲、微生物、毒物、重金屬、電子顯微鏡、分子生物學診斷等，進行種類、公母、成熟度、擱淺及死亡原因等分析；其中 93%海龜檢出 Spirorchiidae 科住血吸蟲，寄生於血管內，主要影響心血管系統並可擴散至多個器官，但推測僅佔致死主因的 32%，診斷以組織病理學較敏感，有 78%的海龜在神經系統中被檢出，但病理學及臨床嚴重度的相關性不明；此外發現並首次報告爬蟲類的魚型鏈球菌（*Streptococcus iniae*），含平背龜 3 隻細菌培養陽性及 4 隻 PCR 陽性、1 隻海蛇 PCR 陽性，但因檢體已分解無法進行組織病理學檢查，魚型鏈球菌為水生動物的重要病原，與溫度等環境因子密切相關，且為人畜共通疾病。

專題 7：解決老問題的新方法：麗龜屬的生態育種策略評估／A New Approach to an Old Question: Evaluation of Ecological Breeding Strategies in Ridley Sea Turtles

相較於其他爬蟲類海龜的產卵數相當多（每季可能產下 300 顆卵以上），且母龜必須耗費許多能量上岸產卵，而龜卵孵化後缺乏親代的照顧，意味著母龜在產卵季會消耗很多能量，包含留在卵黃中供給稚龜的營養；故海龜繁殖成功與否常取決於母龜食物來源的豐富性及質量，獲得營養的機會受限時，可能會產下較少的卵或間隔較多年才回來產卵。

相較於其他種海龜，麗龜屬的欖蠵龜的覓食棲地常分散、距離遙遠且不固定，顯示其食物攝取較為隨機，推測在接近產卵沙灘時仍會持續覓食。本研究藉由分析母龜體內的卵黃生成素（vitellogenin，VTG）及 β-羥基丁酸（BHB），以了解欖蠵龜於產卵季的脂肪利用情形。卵黃生成素（VTG）是一種由肝臟合成的糖脂蛋白，為卵黃前驅物；β-羥基丁酸（BHB）為體內循環的主要酮體，代表肝臟脂肪被利用的程度，酮體為脂肪酸在肝臟中氧化時特有中間代謝產物。

母龜在整個產卵季都需要利用大量的脂肪（VTG 皆維持高值），但皮下脂肪並不會被利用，而在來源不足時肝臟脂肪動員指數（BHB）會增加，顯示欖蠵龜需要持續的進食來維持生殖所需的能量，故產卵及覓食棲地皆需要進行管理，必須監測食物來源並管制漁業活動。

專題 8：“爆米花”實驗：一種檢測海龜消化道運動障礙及評估胃腸道運輸時間的方法／The ‘Popcorn’ Experiment. An Approach for Detection of Digestive Motility Disorders, Assessing Gastrointestinal Transit Times in Marine Turtles

胃腸道排空時間（Gastrointestinal Transit Time）會隨著海龜種類、年齡、覓食方式、食物組成及溫度而有所不同，胃腸道排空時間可幫助了解海龜的消化道功能解剖學及生理學、食物組成及覓食行為、消化道功能及運動障礙等。本研究使用玉米心作為有機（生物性）標記、惰性塑料小圓片作為無機標記，發現青年綠蠵龜的胃

腸道排空時間可長達 22 天，此外使用惰性塑料標記進行排空試驗較生物性標記有效，因其不會褪色或被分解，但仍需考量潛在的化學反應等次要影響；藉由實驗結果可評估食入塑膠的排空時間，並進一步了解有毒物質進入海龜體內的風險，可作為化學物質進入體內的毒理學研究參考。

專題 9：靜脈注射脂質乳劑可減輕海龜赤潮中毒的症狀／Intravenous Lipid Emulsion Reduces Symptoms of Brevetoxicosis in Sea Turtles

在墨西哥灣幾乎每年都發生的赤潮，是由一種會釋出神經毒素 Brevetoxin 的雙鞭毛藻（*Karenia brevis*）引起，在佛羅里達州東岸也偶可見到，目前尚未有完全有效或可接受的治療方式，過去在海龜的治療方式為移除 Brevetoxin 來源並給予利尿劑，較新的治療方式為靜脈注射脂質乳劑（Intravenous Lipid Emulsion，ILE），曾於 2019 年報告使用於紅耳龜。2017-2019 年在佛羅里達州東岸及西岸的赤潮造成超過 500 隻海龜擱淺，約 45%為赤蠵龜、45%為肯氏龜及 10%為綠蠵龜，本研究將存活的海龜進行收容及採血後，給予靜脈注射脂質乳劑（ILE）25 毫克/公斤（速率 1 毫升/分鐘），注射後間隔固定時間多次採血並觀察海龜狀況。

結果給予靜脈注射脂質乳劑（ILE）的 18 隻海龜中有 17 隻（94%）存活釋回，相較於過去傳統的支持性照護存活率 45%（41/92）及利尿劑治療存活率 71%（5/7），顯示靜脈注射脂質乳劑（ILE）治療是有效的，且完全的症狀消除約在 24-48 小時後，釋回時間約在 26±12 天（14-62 天），毒素的降低較傳統治療方式快，症狀幾乎馬上可消除且存活率較高，未來可持續研究以拓展至其他動物及其他藻類毒素。

專題 10：重要的大西洋覓食地－尼加拉瓜莫斯基托斯海岸雌性綠蠵龜的繁殖動態／Reproductive Dynamics of Female Green Turtles (*Chelonia mydas*) on the Miskito Coast, Nicaragua, an Important Atlantic Foraging Ground

海龜繁殖期的觀察方式包括使用超音波、腹腔鏡及剖檢等，在尼加拉瓜的加勒比海岸自治區每年合法捕殺約 6000 隻綠蠵龜。本研究收集各年度母龜進入繁殖期的比例，分別為 1994 年繁殖母龜佔 17%（125 隻產下 3.5 萬顆卵）、1995 年佔 11%（35 隻產下 7.9 萬顆卵）、2020 年佔 27%（41 隻產下 6.8 萬顆卵），並有超過 80%的母龜在尼加拉瓜海岸覓食；此外於 2020 年調查繁殖期母龜被捕獲的比例，結果被捕獲的 37%為未成熟個體、7%為已成熟但未繁殖過、56%為已成熟且繁殖過。

本研究也分析了體型（背甲曲線長）及性腺大小與成熟度及繁殖歷史的關聯性，發現較成熟且繁殖過的母龜體型及性腺皆較大，性腺大小能更準確的預測成熟度及繁殖歷史，其中輸卵管長度預測最準確，但體型大小較易觀察。有鑑於漁業捕殺對海龜族群有重大影響，故減少在繁殖後期尤其大型母龜的捕獲量為保育重點之一。

主題 2：水下生物學

涵蓋海洋中海龜的生物學，包括對海龜所有生活史階段的研究，以更加了解海龜在水下棲地的生物學及生態學，主題包括遷徙、潛水、覓食或導航相關行為及觀察研究，以及目擊、調查及監測在成長棲地或覓食區的海龜數量、保育現況評估、種群、亞種群與集合種群的結構及動態，其他主題亦包括遙測、資源運用、生活模式、交配行為、社交互動、食物組成、海龜在其多樣化生活中所扮演的生態角色棲位、棲地條件對海龜健康及持續性的影響等。

專題 1：平背龜在西澳大利亞與海洋保護區重疊的移動及分布／Movements and Distribution of Flatback Turtles (Natator depressus) in Western Australia and Overlap with Marine Protected Areas

本研究利用衛星發報器追蹤 2005-2020 年的平背龜共 280 隻（268 隻為雌龜、10 隻為雄龜、2 隻未成熟，牠們有 99.5%的時間都在澳洲海域活動），量化 5 個可辨識的種群（從西到東邊分別為：North West Shelf、Eighty Mile Beach、Eco Beach、West Kimberley、East Kimberley）在產卵期、遷徙、覓食行為及現有保育措施的重疊程度，各種行為的重要區域是以海龜在該區域停留的時間長短及出現的海龜數量而定。結果顯示追蹤天數的中位數為 275 天（範圍為 11-820 天），追蹤距離的中位數為 2,832 公里（範圍為 66-11,158 公里），主要都在較淺且近岸的水域（77.1%在水深 50 公尺以淺），這些水域都是需要受到保護。根據本研究可確認澳洲西部平背龜族群偏遠的產卵沙灘及近海覓食地，以作為未來研究及監測優先區域之參考，亦顯示空間網格化有助於海龜追蹤分析。

專題 2：西非的 Poilão 島綠蠵龜在產卵期間的棲地利用與海洋保護區的重要性／Inter-nesting Habitat Use of Green Turtles from Poilão Island, West Africa, and the Importance of a Marine Protected Area

Guinea Bissau 是非洲最大的綠蠵龜產卵保護區，雖然西非 Poilão 島相當小，但每年 8-11 月，每天都有數百隻綠蠵龜在大約 2 平方公里內產卵，全球有 5%的綠蠵龜族群僅在 Poilão 產卵，使其成為非洲最大的綠蠵龜繁殖地，也是世界上最大的 5 個繁殖地之一。Poilão 島位於在 João Vieira and Poilão 海洋國家公園，中央為禁止捕撈區（no-take zone），外圍的緩衝區（peripheral zone）為管制許可區。

為證實該保護區對於綠蠵龜產卵母龜的效益，本研究在 2018-2020 年為 44 頭母龜裝設衛星發報器，以追蹤其產卵期間的活動範圍，結果顯示母龜多在 Poilão 島沿岸 1.96±4.24Km 範圍的保護區內活動（96.17±10%的母龜會在緩衝區內活動、86.45±14.49%的母龜會在禁止捕撈區活動）。

專題 3：使用海龜識別棲息地並評估澳大利亞北部和西北部海洋公園網絡和海洋國家的連通性／Using Marine Turtles to Identify Habitat and Assess Connectivity of the Australian North and North-west Marine Park Networks and Sea Country

本研究蒐集從 2000-2018 年的綠蠵龜 126 隻、平背龜 164 隻、玳瑁 59 隻及欖蠵龜 27 隻的衛星追蹤資料，用來建立不同海龜的洄游網絡模型，以識別澳洲北部及西北部海洋空間管理間的連通性、量化覓食棲地範圍及各海龜棲地間的重疊性。結果顯示綠蠵龜與平背龜在澳洲北部及西北部的海域及陸地間皆有高度連通性，而玳瑁與欖蠵龜則在陸地間有連結、海域間無連結。

澳洲北部的海龜覓食區與海洋公園間的重疊率低，所有海龜核心覓食區的重疊性在澳洲西北部有 4.2-33%，在北部為 11-42%，其中綠蠵龜與平背龜有 50%覓食區重疊，分別在珊瑚礁、大型海藻床及海草床等，顯示海龜棲地的重疊性與底質組成有其關連性，未來可利用覓食棲地的底質測繪作為認定海龜覓食棲地的指標。

專題 4：預測海龜稚龜的近岸擴散方式：透過流體動力學模型結合現場數據與模擬的海龜「粒子」來綜合評估稚龜擴散的方式／Predicting the Nearshore Dispersal of Sea Turtle Hatchlings: A Multidisciplinary Approach to Assessing Dispersal by Combining Field Data with Simulated Turtle 'Particles' via Hydrodynamic Modelling

本研究利用船隻追蹤 2010-2019 年的 350 隻稚龜，並蒐集追蹤時間 1-35 分鐘及岸邊至 7.5 公里距離的環境因子，紀錄風速、波浪及海流等數據，以及稚龜的游泳行為（游泳或漂浮）及泳速，以建立稚龜在近岸的擴散模式。

專題 5：首次在墨西哥太平洋沿岸進行玳瑁母龜的產後洄游衛星追蹤研究，以了解一個小型、遺傳隔離且脆弱的繁殖地／First Satellite Tracking Study of Post-nesting Hawksbill Turtles along Pacific Mexico; Insights from a Small, Genetically Isolated and Highly Vulnerable Rookery

在墨西哥太平洋沿岸有一個小型的玳瑁產卵棲地，每年卵窩數平均小於 50 窩，本研究以衛星追蹤 9 隻產卵期結束的玳瑁母龜及 5 頭混獲成龜（3 頭母龜及 2 頭公龜），產後追蹤距離為 55-509 公里，相較於從 Punta de Mita 出發的母龜其洄游距離（平均 143km），從 Costa Careyes 出發的母龜其洄游距離（平均 386 公里）較長。追蹤結果顯示瑪麗亞群島（Islas Marias）似乎是玳瑁在墨西哥太平洋重要的覓食棲地，但因日益增加的觀光發展及非法捕撈壓力，對該棲息地造成了重大威脅。

專題 6：比較聲學與衛星遙測在量化海龜覓食棲地空間的利用方式／Comparison of Acoustic and Satellite Telemetry as Methods for Quantifying Space Use of Marine Turtles within Foraging Grounds

為了解物種棲地的利用與空間分布以建立保育目標，多會使用衛星追蹤或被動式聲學接收器，本研究在 2017 年 5-10 月間利用聲學及衛星追蹤 9 隻青少龜，追蹤

活動範圍並比較其差異，結果顯示這兩種監測方式在追蹤青少龜的覓食棲地上無顯著差異，衛星追蹤可監測的範圍較廣，聲學則視接收器佈放的密度而定，但兩者的費用都不便宜，未來考慮再測試 GPS 的追蹤品質。

專題 7：結合穩定同位素、聲學及衛星追蹤，深入了解綠蠵龜的棲地生態／Insights into Green Turtle Ecology from Combining Stable Isotopes with Acoustic and Satellite Tagging

Ningaloo 是個位於澳洲西部沿東印度洋的偏遠海岸，沿岸為珊瑚礁，有著熱帶及溫帶海洋動植物群，包括海洋爬行類及哺乳動物，也是綠蠵龜母龜的產卵及棲息地，為了解沿岸綠蠵龜生態，本研究利用聲學及衛星追蹤海龜的活動範圍，比較 148 隻綠蠵龜的鱗片、皮膚組織及血液分析等，發現鱗片及血液較適合量測海龜體內穩定同位素的組成，且會隨著海龜體長大小而變化。

稚龜從大洋到 Ningaloo 的沿海棲地後傾向以海草為主食，移至潟湖及珊瑚礁後則以海藻及水母為食，直到體長大於 70 公分，顯示海龜隨著體長增長，飲食的多樣性及覓食時間也會增加，並以白天覓食為主。聲學及衛星追蹤資料顯示，海龜體長未達 40 公分前多待在近岸 200 公尺的範圍內，而體長達 90 公分後其活動範圍可達距岸 1100 公尺。此外衛星追蹤也證實這些海龜是常駐的，在長達一年多的追蹤後，這些海龜的移動距離與被捕獲地點不超過幾公里。

專題 8：辨識西印度群島 Antigua 玳瑁體內的同位素／Identifying the Isotopic Niche of Hawksbill Sea Turtles in Antigua, West Indies

成熟的玳瑁被認為其主食為海綿動物，牠們於珊瑚礁生態系扮演重要的角色，且為珊瑚礁關鍵物種，穩定同位素通常以硬組織進行分析，C13 及 N15 分析提供了許多基礎棲位及覓食棲地位置的辨識。本研究收集在西印度群島 Antigua 的 100 隻產卵玳瑁母龜的角蛋白組織，分析體內的穩定同位素組成以證實其食性，結果顯示年紀越大的海龜其棲位的寬度越窄、飲食越專一。

專題 9：穩定同位素分析顯示哥斯大黎加西北部的綠蠵龜、欖蠵龜及革龜不同的覓食策略／Stable Isotope Analysis Reveals Divergent Foraging Strategies of Green, Olive Ridley, and Leatherback Turtles in Northwest Costa Rica

本研究於哥斯大黎加西北部的產卵母龜族群綠蠵龜 28 隻、欖蠵龜 20 隻及革龜 4 隻，希望藉由體內穩定同位素組成分析，來探討：1) 辨別不同種類海龜的覓食策略、2) 辨別牠們產卵前的覓食棲地、3) 體長大小對同位素值的影響。該區域的綠蠵龜在沿岸覓食，且營養水平高於全球其他區域；欖蠵龜則與其他區域較無差異，且體長越大其體內 N15 同位素值顯著減少，表示體型較大的欖蠵龜偏愛待在 N 同位素濃度較低的深層海水中；革龜除有遠洋性質外，相較於先前的研究其體內有較高的 C13 同位素值，推測因革龜在沿岸覓食所致。

專題 10：Connect 6：追踪 6 種海龜移動路徑的全球網絡分析／Connect 6: A Global Network Analysis of Movements Tracked for Six Sea Turtle Species

本篇為 MiCO（Migratory Connectivity in the Ocean；https://mico.eco/system）網站介紹，結合各種遷徙性海洋生物的追蹤資料及所發表的論文，讓研究人員或想了解的人，可以看到這些物種依賴的關鍵棲息地及遷徙路徑，將數據轉化納入國際管理及政策框架，以協助遷徙物種的長期保育。

專題 11：是生態陷阱還是有利棲地？第一筆證據說明未成熟的海龜可能在東北大西洋的活動範圍內生存／Ecological Trap or Favorable Habitat? First Evidence That Immature Sea Turtles May Survive at their Range-limits in the North-east Atlantic

無論是因為營養或溫度條件，非常態的環境事件常會增加海龜擱淺的風險，本研究結合法屬大西洋及英吉利海峽沿岸 1988-2020 年的目擊紀錄與 2008-2020 年的追蹤資料，評估比斯開灣（Bay of Biscay）是生態陷阱還是未成熟海龜喜愛的棲地。該海灣有大量浮游生物可供未成熟海龜覓食，但有高達 75%的活體擱淺紀錄，在冬天常有 17℃的低溫，顯示低溫對未成熟海龜為一種生態陷阱。

專題 12：赤蠵龜的晝夜活動模式／Diurnal Home-range Patterns in Loggerhead Turtles

海洋生物的棲地與人為活動相互的重疊性日益增加，因此必須平衡受威脅物種的生存與時間空間上的利用，了解該物種的棲地利用行為，可進一步得知棲位重疊性及評估管理效益。本研究利用 FastLoc GPS 的追蹤標識，期進一步了解大堡礁海域赤蠵龜及平背龜在棲地利用時間上的特性，結果顯示赤蠵龜白天的覓食活動力高於晚上，且移動距離也較遠，而平背龜白天及晚上的活動力及距離皆無顯著差異。

專題 13：開發一種配備立體視頻攝像機的無人飛行器，用於測量海龜和其他海洋動物群／Developing a Stereo-video Camera Equipped Unoccupied Aerial Vehicle for Measuring Sea Turtles, and other Marine Fauna

近年利用 UAV 進行海龜的實地調查已相當普遍，但在準確測量體長小於 2 公尺生物的能力仍然有限，而型態量測的數據對於物種的生物學或族群分布相當重要，因此本研究發展了一套立體攝像機（SVC）搭載在無人機上，進行綠蠵龜及護士鯊的體型大小量測試驗，此系統的平均絕對誤差為 2.12 公分，在約 1.07 公尺以淺的深度仍可進行量測，若再深則會因折射嚴重而無法辨識測量點。

使用 SVC 與手動測量值進行比較，SVC-UAV 在綠蠵龜的量測上平均誤差為 4.44 公分，護士鯊的平均誤差為 7.16 公分。使用線性模式分析，估計綠蠵龜在使用 SVC 與手動測量上的斜率為 1.085，且 SVC 在生物游泳及潛水時仍能達到精準度，顯示動物的距離及體型大小不會嚴重影響 SVC 的測量誤差，UAV-SVC 是一套在淺水域進行生物調查的好工具，未來將朝開發較小的無人機、自動校正及降低測量誤差等方向進行。

專題 14：多參數感應器標識為海龜的空間生態學注入新活力／Machine Learning and Multi-sensor Tags Breathe New Life into the Spatial Ecology of Sea Turtles

在 2018-2021 年將多功能儀器裝設在西澳金伯利（Kimberley）海岸羅巴克灣（Roebuck Bay）上的 51 隻成熟平背龜，以觀察其水下行為，收集超過 102 天的活動紀錄，本研究為開發一套軟體以彙整這些紀錄資料，紀錄顯示海龜有 43.23%的時間覓食、33.29%在休息，此外在 24.17%的海龜中覓食與休息都發生於潛水期生，顯示海龜在潛水時會有許多不同的行為。

專題 15：平背龜雉龜對於海上光線的反應／Response of Flatback Turtle Hatchlings to Light Emitting Diodes at Sea

本研究利用海上燈光的明亮度與方位，測試剛孵化的平背龜雉龜下海後的游向，結果顯示若燈源與雉龜原爬行方向相同，燈源的瓦數多寡會影響稚龜的游泳速度；若燈源與原爬行方向相反，則稚龜下海後游泳的方位較多變，但所花費的時間與速度無顯著差異；故稚龜會受水上燈源影響其游泳方向、時間及速度。

專題 16：比較來自感染纖維乳突瘤的綠蠵龜、欖蠵龜及肯氏龜的海龜第 5 型皰疹病毒（ChHV5）基因組／Evolutionary Comparisons of Chelonid Alphaherpesvirus 5 (ChHV5) Genomes from Fibropapillomatosis-afflicted Green (*Chelonia mydas*), Olive Ridley (*Lepidochelys olivacea*) and Kemp’s Ridley (*Lepidochelys kempii*) Sea Turtles

纖維乳突瘤（Fibropapillomatosis，FP）是存在於全球海龜中的一種流行疾病，其特徵是可在海龜身上觀察到許多扁平或突起的腫塊，具傳染性且會使海龜虛弱，熱帶及亞熱帶海域所有種類的海龜都會感染，以綠蠵龜最為常見，該疾病被認為與海龜第 5 型皰疹病毒（Chelonid Alphaherpesvirus 5，ChHV5）的感染有關。本研究從 3 種海龜取得 20 個 ChHV5 基因，以了解病毒的多樣性及基因進化程度，結果顯示 ChHV5 的變異性很高，且具有可在不同物種間傳播的傾向。

專題 17：茅利塔尼亞（Mauritania）的阿爾金岩石礁國家公園（Banc D'arguin）是大西洋綠蠵龜主要的覓食區／The Banc D'arguin (Mauritania) is a Major Foraging Area for Green Turtles in the Atlantic Ocean

佔地約 12,000 平方公里的阿爾金岩石礁國家公園（Banc D'arguin）成立於 1978 年，於 1989 年被聯合國教科文組織列為世界遺產，是西非最大的海洋保護區，為了解該地區海龜族群數量及年齡組成，以及有多少母龜從幾內亞比索（Guinea-Bissau）的比哈戈斯（Bijagos）群島產後洄游到此，字 2018 年起除了收集當地漁民混獲的綠蠵龜，也追蹤了比哈戈斯（Bijagos）群島成年海龜，該群島是距離阿爾金岩石礁國家公園（Banc D'arguin）3000 公里範圍內的重要綠蠵龜產卵地（估計有 25,000 頭母龜會在該群島產卵）。

追蹤的 35 隻母龜中，有 37%來自比哈戈斯（Bijagos）群島，推估約有 9,250 隻母龜來到阿爾金岩石礁國家公園（Banc D'arguin）覓食；另 9 隻成年公龜的追蹤資料顯示，來自幾內亞比索（Guinea-Bissau）的成年公龜也在此覓食；從漁網混獲的資料推估，該區域約有 100,000 頭未成年海龜。此外基因定序結果顯示，阿爾金岩石礁國家公園(Banc D'arguin)的未成年海龜主要來自西非的幾內亞比索(Guinea-Bissau)（86%），有些則來自加勒比海及南美（11%）及阿松森島或幾內亞灣（3%）；顯示阿爾金岩石礁國家公園（Banc D'arguin）有來自大西洋各地區孵化的綠蠵龜，對於該物種的存續十分重要。

專題 18：從水下及空拍觀查赤蠵龜覓食時的互動／Underwater and Aerial Observations of Aggressive Interactions among Loggerhead Sea Turtles over Foraging Resources

本研究地點位於希臘伊奧尼亞群島南部的 Zakynthos Island，在 2010-2021 年間以水下及空拍技術觀察赤蠵龜覓食海綿時的互動模式，透過影像辨識系統，紀錄了 31 隻未成熟及 8 隻成熟海龜。超過 900 分鐘的水下錄影片中，在 25 隻海龜共紀錄了 95 次活動行為，海龜間的互動僅佔 1%，其餘皆為游泳及覓食；在 600 分鐘的空拍觀測中也鮮少紀錄到海龜活動範圍的重疊，推測牠們已從彼此的互動中劃定界線。本研究觀察到在覓食區的海龜有一定的社會行為及相容性，也可能有階級結構的存在，較強勢海龜可能從食物中獲取更多的能量。

專題 19：海龜在非常淺的水中潛水的模式／Patterns of Sea Turtle Diving in Very Shallow Water

海龜的潛水模式與浮力及肺部的氧氣儲存有關，本篇研究玳瑁在水深小於 2 公尺的覓食棲地中的潛水行為模式，結果顯示在水溫 24-38℃，玳瑁的平均活動深度為 0.5-1.8 公尺，潛水時間為 11-32 分鐘，水深越淺潛水的時間越長，為 U 型潛水模式，且相較於綠蠵龜及赤蠵龜，玳瑁似乎更能在淺水域待很長的時間。

專題 20：Snapper GPS：利用低成本的 Snapshot GNSS 接收器追蹤赤蠵龜／Snappergps: Deployment of a Low-cost Snapshot GNSS Receiver to Track Loggerhead Sea Turtles

本篇為一種海龜追蹤技術介紹，使用類似 GPS 的全球導航衛星系統（GNSS），GNSS 的訊號在水下無法追蹤，而是利用海龜浮出水面呼吸時追蹤，傳統的 GNSS 需要持續 30 秒衛星才能定位，Snapshot GNSS 不需接收衛星訊號，只需幾毫秒的信號來解決定位問題。Snapper GPS 是一種小型、便宜、低耗電量的接收器，每次海龜浮出水面時，該設備都會捕獲低分辨率的 12 毫秒衛星訊號快照，並且會存儲快照直到從海龜身上取下，數據可透過公開網頁（https://snapper-gps.herokuapp.com）上傳到雲端，運用新的機率訊號處理演算法計算海龜的軌跡。Snapper GPS 最新版本的成本低於 30 美元（不含外殼），且可使用兩個小型 LR44 鈕扣電池運行數年，Snapper GPS 是利用多頻道 GNSS 故解析度可達到 10 公尺。

在 2021 年的夏天，運用 Snapper GPS 在維德角（Cape Verde）的 Maio 島進行 20 隻產卵母赤蠵龜的追蹤，並從 9 隻個體中回收，但因為一些問題只有 3 隻完成追蹤訊號。訊號顯示 1 隻產卵母龜在島周邊移動，其餘的活動海域亦離產卵沙灘不遠。另比較 Snapper GPS 與輔助 GPS 標識，結果顯示 Snapper GPS 較快取得定位且製作成本更低、能源效率更高。

專題 21：在巴西亞熱帶沿海水域大量的革龜／High Number of Leatherback Turtle Sightings on Brazilian Subtropical Coastal Waters

革龜是體型最大且分布最廣的海龜，通常可在產卵棲地與覓食棲地間洄游數千公里，在巴西海域的革龜研究多來自於意外混獲或擱淺資料。在一個觀光旅遊高度發展的海洋保護區，同時涵蓋熱帶及亞熱帶物種，包含其他種海龜，在生態及生物地理學上皆十分重要，該保護最近制定了禁捕區的管理計畫，本研究以望遠鏡記錄沿岸 3 公里範圍內的革龜的數量，在 2019 年 11-12 月共有 67 隻次革龜目擊紀錄，最大深度在 60-87 公尺，在其他月份則無目擊紀錄；其中曾在一天內記錄到 20 隻，皆距岸小於 3 公里，多能在覓食水母或靠近水面休息，此時盛行東北季風且溫度低於 18℃，有典型的春季湧升現象；進一步分析沿岸海龜覓食的位置，與浮游生物聚集處及漁民傳統利用範圍皆為重疊。

專題 22：利用 Photo-ID 技術調查珊瑚礁岩處的海龜數量／A Collaborative Photo-ID Approach to Determine Sea Turtle Parameters in a Rocky Reef Foraging Ground

海龜多數時間在覓食棲地中生活，但多數研究卻是在海龜的生殖產卵上，本研究利用較少花費、無侵入性的影像紀錄，調查覓食棲地的海龜（綠蠵龜及玳瑁）的時空分布及感染纖維乳突瘤（FP）的比例。研究地點位於巴西東南方阿拉亞爾多卡博（Arraial do Cabo）的珊瑚礁海域，在 2006-2021 年間拍攝的 641 張照片中，可辨識的綠蠵龜有 174 隻、玳瑁有 32 隻，纖維乳突瘤（FP）只出現在綠蠵龜身上，機率高達 13.99%，其中只有 2 隻有腫瘤消退的現象。阿拉亞爾多卡博（Arraial do Cabo）的珊瑚礁海域可作為一個重要的海龜保護區，但也有許多的人為發展活動，因此提出重要的管理措施來保護海龜十分重要。

專題 23：使用 Photo-ID 影像識別軟體進行綠蠵龜個體辨識／Success with Photo Identification (Photo-ID) Software Using, Hotspotter, Improves Green Turtle Mark-recapture Efforts

Photo-ID 是近年來追蹤野生動物的有效方式，本研究利用 Photo-ID 在巴哈馬的阿巴科群島（Abaco）進行綠蠵龜亞成龜的辨識，在 2013-2019 年間記錄了 324 隻綠蠵龜並進行 HotSpotter 測試，HotSpotter 是一套自動影像辨識軟體，結果使用軟體辨識有 92%吻合度，而人工僅辨識出 90 張照片，顯示 HotSpotter 的辨識成效極佳。

專題 24：利用無人機調查估算保護區內的未成熟海龜密度／Density Estimates of Immature Foraging Turtles Assessed by Drone Surveys

印度洋中部的查哥斯群島（Chagos Archipelago）是許多原始海洋生物的棲地，也是世界上最大的海洋保護區之一，綠蠵龜及玳瑁分別在 1968 年及 1970 年被立法保護，近幾年無人機（UAV）常被用來調查海龜的行為、性別比例、分布情形、密度及豐度。本研究於 2021 年 2-3 月以無人飛機進行未成熟綠蠵龜及玳瑁的豐度估計，先將捕獲的海龜背甲以油漆標記，再以無人機進行調查估算族群量；並同時進行 27 隻未成熟海龜（25 隻玳瑁及 2 隻綠蠵龜）的衛星追蹤，以估算海龜移動範圍。結果顯示在查哥斯群島（Chagos Archipelago）主島－迪亞哥加西亞島（Diego Garcia）的淺潟湖，估算海龜密度在高潮位時為 265 隻/平方公里，低潮位時為 499 隻/平方公里，且玳瑁的數量（223-419 隻/平方公里，佔 84%）遠高於綠蠵龜（42-80 隻/平方公里，佔 16%），故此處相較於其他區域為全球未成熟玳瑁密度相當高。

專題 25：探討綠蠵龜的啃食對海草床的影響／Dynamics and Aging of Green Turtle Grazing Plots in Seagrass Meadows

綠蠵龜的主食為海草，且會在海草床上反覆啃食，近年來全球海草床面積逐漸衰退，因此海龜啃食為經常被討論的議題；了解海草床被啃食及老化情形，對於評估海草床的永續性及綠蠵龜在海草生態系中所扮演的角色十分重要。本研究地點位於巴拿馬的伊柳塞拉島（Eleuthera），該島東部沿海有大面積的海草床，在此分別進行增加及減少海草攝食量的 2 個實驗，皆位於水深小於 4 公尺的淺水域，該區域的優勢種海草為龜裂泰來草（T*halassia testudinum*），主要攝食者為青年綠蠵龜，結果顯示雖然綠蠵龜會啃食海草，但也可增加棲地生物的複雜度。

專題 26：確定遷徙物種繁殖聚集的覓食區起源模式：西北大西洋的赤蠵龜／Identifying Patterns in Foraging-area Origins in Breeding Aggregations of Migratory Species: Loggerhead Turtles in the Northwest Atlantic

為了解產卵海龜來自哪些覓食棲地，本研以用穩定同位素分析在美國東部（北卡羅來納州、南卡羅來納州、喬治亞州）7 個產卵地的赤蠵龜組織樣本，得知這些母龜來自西北大西洋的 3 處覓食區，有 84.4%的母龜洄游到中大西洋灣的覓食區，13.4%的母龜利用南大西洋，2.2%的母龜會洄游到亞熱帶西北大西洋更偏南的覓食區。每處海龜覓食棲地都有獨特的生態特徵、環境波動及人為威脅，進而影響產卵母龜的族群數量、豐度及生產力，因此來自覓食棲地的訊息，對於準確評估海龜族群趨勢及制定有效的區域管理策略相當重要。

專題 27：近 7 年來在東太平洋最重要的覓食地進行玳瑁監測／Seven Years of Hawksbill Turtle Monitoring in the Eastern Pacific´s Most Important Foraging Site

巴拿馬科伊巴玳瑁監測計畫（The Coiba Hawksbill Project）自 2014 年開始執行，由一個多國研究小組每 6 個月進行一次玳瑁監測活動，結果顯示科伊巴國家公園是東太平洋玳瑁密度最高的區域，目前正持續評估玳瑁數量及潛在產卵棲地。本研究利用 12 隻玳瑁進行衛星追蹤，以了解玳瑁的移動行為、遷移路線及可能的產卵沙灘。為確認玳瑁來自哪些產卵海灘，也利用鰭狀肢標記建立了覓食棲地（科伊巴國家公園）與產卵棲地（哥斯大黎加奧薩半島、巴拿馬阿蘇埃羅半島）之間的連結。

專題 28：美屬維爾京群島中的聖克魯斯島（Saint Croix）上革龜產卵間期的潛水行為和策略／Diving Behavior and Energetic Strategy of Leatherback Sea Turtles During Internesting Intervals on St. Croix, U.S. Virgin Islands

在美屬維爾京群島中的聖克魯斯島（Saint Croix）產卵的革龜，每個產卵季約會產下 5-6 窩卵，每次產卵間隔為 10 天，革龜在冬季主要以水母或凝膠狀浮游動物為食，但在產卵間期的覓食行為及食物偏好仍不清楚。本研究假設革龜在產卵間期的覓食行為較少且為機會主義，以衛星追蹤及微型動物攝影機，記錄其行為模式及移動距離。

結果顯示革龜活動區域時間長短依序為深水區（62%）、淺水區（33%）、在水面活動的時間較短（5%），攝影機記錄到 6 種凝膠狀浮游動物被捕食，但覓食模式為少見且隨機的，故覓食努力量的減少顯示在產卵期間革龜基本上是禁食的。革龜在產卵間期約消耗 25.4 公斤脂肪，產卵行為約消耗 12 公斤脂肪，整個產卵季約消耗 36 公斤脂肪，佔革龜全身脂肪的 11%，故革龜產卵季前會在覓食棲地儲存足夠能量以備產卵期間的禁食。

專題 29：墨西哥灣成年雄性赤蠵龜的活動範圍及核心利用區／Home Range and Core Use Areas of Adult Male Loggerheads (*Caretta caretta*) in the Gulf of Mexico

目前對於赤蠵龜成熟公龜的空間分布的研究相當稀少，因為牠們所有時間都待在海裡，因全球暖化使沙灘溫度升高，導致孵出的公龜比例降低，故了解公龜的生活史、移動模式及路徑，在海龜保育上相當重要。

本研究利用 2006-2021 年佛羅里達的 9 隻擱淺康復原的公龜進行洄游追蹤，以了解牠們的生活範圍及核心利用區，公龜的背甲長為 91.1-106.1 公分，共追蹤了 291-866 天，活動範圍為 1,019.2-98,802.8 平方公里（中位數為 3158.6 平方公里），9 隻龜的活動範圍皆包含墨西哥灣的佛羅里達州西南部，其中 6 隻只在佛羅里達州西南部活動，3 隻洄游到美國東岸；核心利用範圍為 3.8-10,103.4 平方公里（中位數為 208.7 平方公里），其中 4 隻的核心利用區在佛羅里州達麥爾茲堡近岸，另 4 隻的核心使用區在靠近佛羅里達州的坦帕灣（Tampa Bay）口，顯示這兩個區域是赤蠵龜公龜常出現的活動範圍。公龜的體型大小與活動範圍有正相關，且對於近岸的利用較遠洋多。

專題 30：22 年的鰭狀肢標記計畫：巴西南部及烏拉圭沿海水域的綠蠵龜連通性及發育地／22 Years of Flipper Tagging Programs: Green Turtle Connectivity in Feeding and Developmental Grounds of Southern Brazilian and Uruguayan Coastal Waters

鰭狀肢的標記放流是最簡單且花費最少的方式，故大量被使用在海龜的洄游追蹤研究，巴西及烏拉圭的南部沿海為南大西洋青少龜重要的覓食及成長海域，本研究包含許多單位在 2000-2021 年間於巴西及烏拉圭之間不同覓食棲地的青少年綠蠵龜移動觀察，本次合作提升了對南大西洋綠蠵龜連通性的認識，更有助於大範圍的保護策略規劃與執行。

主題 3：產卵生物學

主要關注於產卵沙灘、產卵母龜、卵窩、稚龜、龜卵及其密切相關的議題，包括評估產卵種群規模、種群建模參數、產卵趨勢的長期監測、預測種群變化、海龜在產卵沙灘的行為、孵化成功率及孵化生產力、稚龜尋海行為、龜卵存活率、新發現的產卵棲地、環境變化對產卵棲地的影響等。

專題 1：孵化成功率及主要性別比率：西印度群島安提瓜玳瑁的現狀與 30 年展望／Hatching Success and Primary Sex Ratios: Current Status and a 30-year Perspective for a Hawksbill Rookery in Antigua, West Indies

在西印度群島中安地卡島（Antigua）的 Jumby Bay 是玳瑁重要產卵棲地，The Jumby Bay Hawksbill Project （JBHP）是一項針對當地玳瑁產卵棲地的長期監測研究及保護計畫，本研究藉由 30 年的卵窩溫度監測數據，顯示 Jumby Bay 所孵化的玳瑁有雌性化的趨勢，推測為全球暖化氣溫升高所致，此處孵化率約 75-80%，平均孵化溫度為 32℃，最高為 36℃，雌性比例高達 90%，推測為全球暖化氣溫升高所致。

專題 2：使用現場孵化時間來制定及驗證在自然卵窩中經歷不同溫度變化期間胚胎發育的模型／Using in situ Incubation Time to Validate Modelling of Embryo Development during Variable Temperatures Experienced in Natural Nests

海龜胚胎的發育速度取決於孵化溫度，高溫會導致更快的發育，從而縮短孵化時間，但在野外深度 20-30 公分較淺卵窩的龜卵，孵化溫度每天都有波動，且孵化溫度通常會在孵化結束時升高，因為不斷增長的胚胎會產生大量的新陳代謝。為模擬野外孵化溫度的變化，研究人員使用恆溫設備進行實驗，希望透過實驗數據來預測野外卵窩中的胚胎發育率，但目前遭遇了以下困難：

1. 實驗中的海龜胚胎無法在恆定的 33 度℃存活，因為胚胎在早期發育階段若溫度超過 33℃就會死亡，但是在自然界胚胎晚期甚至孵化時的溫度卻為 33-36℃。
2. 難以確定埋在深度 30-80 公分卵窩中龜卵的確切孵化時間。

因此胚胎在經歷不同溫度變化的發育期模式建構，還是必須配合在卵窩中置放溫度計等其他方式，來預測胚胎性別決定開始及結束的時間及孵化時間。

專題 3：對西澳大皮爾布拉（Pilbara）地區平背龜產卵海岸的脆弱性整體評估／Stock-wide Assessment of Coastal Vulnerability at Flatback Nesting Sites in the Pilbara Region of Western Australia

氣候變遷所造成的海平面上升及颶風頻度增加，增加了海龜產卵沙灘的不穩定性，因此確認主要產卵棲地是全球海龜保育的重要目標。本研究使用 InVEST（Integrated Valuation of Ecosystem Services and Trade-offs，生態系統服務和權衡的綜合評估）來探討皮爾布拉（Pilbara）地區的平背龜產卵棲地受海灘侵蝕及遭遇洪水的

風險。皮爾布拉（Pilbara）地區每年 11 月到隔年 4 月都會有平背龜回來產卵，故此處沙灘所遭受的風險對該族群的存續影響極大，該地區 600 公里的海岸線共有 402 處平背龜的產卵沙灘，其中 34%的產卵沙灘有高度風險，5 處屬於低風險，故對於該處沙灘的保護是海龜保育及海岸經營管理的重點。

專題 4：35 年來阿爾達布拉環礁（Aldabra Atoll）的綠蠵龜成龜體型長期變化及塞席爾（Seychelles）南部的性別形態特徵／Long-term Changes in Adult Size of Green Turtles at Aldabra Atoll across 35 Years and Sexual Dimorphism in the Southern Seychelles

阿爾達布拉環礁（Aldabra Atoll）是西印度洋第一個受到保護的綠蠵龜產卵棲地，1968 年起禁止獵捕海龜且在同年開始了海龜監測計畫，為該地區執行時間最長的海龜追踪數據蒐集計畫。本研究蒐集 1982-2016 年在阿爾達布拉環礁（Aldabra Atoll）共超過 4,600 筆成熟綠蠵龜雌龜的背甲曲線長及寬，統計分析顯示成熟雌龜的平均背甲長及寬都有顯著下降的趨勢，背甲曲線長每 10 年減少 0.64 公分，平均體重每 10 年減少 2.3 公斤。研究期間雖然產卵母龜數每年增加，但雌龜的體型愈來愈小，每窩所產下的龜卵數也減少。在塞席爾（Seychelles）南邊的成龜，雌龜體型較雄龜大，背甲曲線長及寬各大 1.09 及 1.10 倍，體重也重 1.25 倍。雌龜體型變小可能因首次加入產卵的母龜增加，也可能因環境及氣候影響降低生長速度及平均成熟體型。

專題 5：了解剛孵化稚龜的多種捕食者／Understanding Multi-species Predation on Emerging Sea Turtle Hatchlings

本研究地點為澳洲寧格羅珊瑚礁區（Ningaloo Reef）的赤蠵龜產卵棲地－Bungelup beach 及 Gnaraloo Bay，當地稚龜孵化後會遇到的捕食者包含幽靈蟹、海鷗及老鼠，本研究利用長達 7500 小時的攝影進行監測，觀察龜卵及稚龜遇到的捕食者。結果顯示在 Gnaraloo Bay 的幽靈蟹密度較 Bungelup beach 高 2 倍，其洞穴密度在稚龜孵化期（2-3 月）較母龜產卵期（12-1 月）為高。在 Bungelup beach 有 36%的龜卵被幽靈蟹捕食而 44%可孵化成稚龜，但孵化的稚龜中約有 43%會被幽靈蟹及銀鷗捕食；在 Gnaraloo Bay 有 79%的龜卵被幽靈蟹捕食，而 16%可孵化成稚龜，但並沒有觀察到回到大海的稚龜。

專題 6：卵窩溫度對革龜孵化表現及形態的影響／The Impacts of Nest Temperatures on Leatherback (*Dermochelys coriacea*) Hatchling Performance and Morphology

為了解卵窩孵化溫度與革龜孵化自主爬行能力之間的關聯性，本研究選擇美國佛羅里達州 Juno Beach 的 2 處不同沙灘特性進行實驗，使用 HOBO U22 的溫度計放置在 13 處革龜卵窩中紀錄產卵季前中後的溫度。產卵季初期卵窩平均孵化溫度為 29.42℃、稚龜平均爬行速度為 0.029m/s；產卵季中期卵窩平均孵化溫度為 31.08℃、稚龜平均爬行速度為 0.026m/s；產卵季結束前卵窩平均孵化溫度為 32.07℃、稚龜平均爬行速度為 0.027m/s；顯示產卵季中期及後期的卵窩孵化溫度顯著高於產卵季初

期，但稚龜的爬行速度並沒有顯著相關，但稚龜的翻正反應與卵窩溫度呈現負相關，卵窩溫度越高稚龜的翻正反應越慢。

專題 7：稚龜的近岸死亡率與其在孵化中的作用是否有其關聯性／Near-shore Mortality’s Role in Sea Turtle Hatchling Evolution

稚龜孵化後在進入海洋中的第 1 個小時內死亡率最高，本研究為確認此類天擇是否會在稚龜身體形態或游泳速度產生進化的影響，在哥斯達黎加大西洋沿岸的革龜產卵棲地進行 2 年的實驗。結果顯示近岸的死亡率並不會讓海龜因天擇而改變孵化形態，存活靠的是海龜自行的隨機應變能力，因此為了保護這個脆弱的族群，建議以人為方式增加稚龜族群的入添量，且此方式並不會降低新世代整體的適應能力。

專題 8：墨西哥灣北部赤蠵龜產卵地受到海浪沖刷的影響／Exposure and Consequences of Wave Wash-over for Loggerhead Sea Turtle Nests in the Northern Gulf of Mexico

海浪的侵襲對於卵窩有顯著的危害，持續暴露在波浪下會影響胚胎的死亡率、稚龜的發育、體型大小及性別比例，為了解卵窩暴露在海浪下對龜卵孵化的影響程度，本研究在 2016-2019 年在墨西哥灣北部 40 處赤蠵龜產卵沙灘進行實驗，此地區在颱風季節，平均有 50%的可用沙灘面積及 34%的卵窩都會面臨嚴重的海浪侵襲，數據顯示有海浪侵襲的 42.3%產卵地點孵化率只有 45%，隨著每次的海浪沖刷，卵窩的成功孵化率平均下降 71%。

專題 9：將綠蠵龜卵窩遷移至開闊的沙灘會產生高度偏向雌性的幼龜，龜卵孵化場管理的影響／Relocating Green turtle Nests to Open Beach Areas Produce Highly Female-biased Hatchlings, Implications for Sea Turtle Hatchery Management

近年來有些保育策略是將卵窩遷移至較安全的地區，以保護龜卵，但無遮陰的海龜孵化場的高溫可能會影響龜卵孵化率及性別比例，本研究地點遷移後的卵窩溫度較自然卵窩高了 1.8℃，且雌性稚龜比例增加了 45%。

專題 10：Corozalito：哥斯大黎加新欖蠵龜集體產卵沙灘／Corozalito: A Nascent Arribada Nesting Beach in Costa Rica

欖蠵龜有個獨特的產卵行為，大量的母龜會集體上岸產卵，稱為「Arribadas」，Playa Corozalito 是哥斯大黎加南部尼科亞半島在太平洋側的未開發海灘，在 2000 年底開始有欖蠵龜進行 Arribadas 產卵行為，在 2019-2021 年共紀錄了 12 次 Arribadas，估計共產下超過 150,000 顆龜卵，且發現每年 Arribadas 的頻度與規模都在增加中，平均孵化率為 59%、孵化溫度為 32.3℃。在哥斯大黎加相較於另外兩個集體產卵地 Nancite 及 Ostional，Corozalito 有較高的龜卵孵化率，是世界上第 3 個重要的欖蠵龜集體產卵地，未來的監測及保育相當重要。

專題 11：卵窩底質如何影響孵化成功率及稚龜的表現型？以野外及實驗室的赤蠵龜龜卵進行研究／How do Incubation Substrates Influence Hatching Success and Hatchling Phenotype? A Field and Experimental Study on Loggerhead Sea Turtle Eggs

本研究收集 2017-2021 年野外及實驗室的赤蠵龜卵窩數據，探討底質與孵化率、胚胎發育、稚龜品質之間的關聯性，野外地點選在非洲外海的維德角群島（Cabo Verde）中的 Maio 島，有世界上較大赤蠵龜產卵族群之一，沙灘的顏色有顯著的差異，有黑色、混合及光亮的沙灘，在穩定的溫度及濕度下，進行龜卵與不同卵窩底質的實驗。結果顯示母龜對於不同沙灘底質並沒有特殊的偏好，而龜卵的孵化情形卻因底質不同而有顯著差異，無論在野外或實驗室都得到同樣的結論。若底質為火山基質（顏色上是黑色，只有些微的碳酸鈣成分），平均孵化率為 30.3±20.2%，相較於混合基質（46.1±26.5%）及純粹碳酸鈣基質（78.1±18.2%），有較高及較早的胚胎死亡現象；若基質以碳酸鈣為主，孵化的稚龜較多且體型較大，孵化溫度顯著高於火山基質；故顯示除了溫度外，卵窩的底質也是決定孵化率的因素之一。

專題 12：維德角群島（Cape Verde）博阿維斯塔島（Boa Vista）上瀕臨滅絕的赤蠵龜族群的產卵間期及產卵頻率／Internesting Period and Nesting Frequency of the Endangered Population of the Loggerhead Turtle (*Caretta caretta*) on the Island of Boa Vista, Cape Verde

本研究利用再標記的方式，於 2013-2020 年在 Joao Barrosa 沙灘（一個海龜自然保護區）進行赤蠵龜產卵季產卵頻率的監測，此處的產卵族群正在增加中，每年都有新加入的產卵母龜，每隻母龜平均產 1.4-4.0 窩卵，新加入的母龜與舊有的母龜的產卵週期無顯著差異，但新加入的母龜體型明顯較小，平均產 1.8-4.0 窩卵，而舊母龜則產 2.0-4.1 窩卵。因為產卵母龜的逐年增加，要完整記錄所有產卵事件變得困難，但也觀察到新加入的母龜產卵數有下降的趨勢；此外氣溫也會影響產卵頻率，海水表面溫度增加，產卵週期則縮短。本研究結果顯示母龜體型的小型化，會影響每隻母龜產下的卵窩數。

專題 13：開曼群島綠蠵龜族群的增長與動態／Population Growth and Dynamics in Assisted Colonisations of Green Sea Turtles in the Cayman Islands

因為環境的改變，許多物種會遷徙到新的適合棲息的區域，環境的變化對長壽的生物影響較大，而異地保育的行動才能減緩族群的衰退。本研究為了解開曼群島 2 個野外綠蠵龜族群的基因研究，作為引入新龜計畫的參考。

歷史上開曼群島被認為有世界上最大的綠蠵龜產卵族群之一，但因為人類的利用，到 1800 年代初產卵族群已枯竭，1980 年代該處的綠蠵龜產卵族群則被列為局部滅絕，1983 年設立了海龜農場，並在大開曼島及小開曼島釋放人工繁殖的綠蠵龜。在大開曼島及小開曼島所收集的 314 窩野外卵窩，進行微衛星 DNA 標記，顯示有 57 窩來自野外族群、257 窩來自海龜農場的產卵母龜，即有 88.1%的卵窩來自

海龜農場；而同一隻母龜產下的卵窩有 60%以上在 1 公里範圍內，顯示人工繁養殖的海龜對於產卵棲地的忠誠度高。

本研究另有結果顯示，體型較大的母龜產卵數較多，且有較高的孵化率，但與是否來自海龜農場無相對關係，推測海龜農場的繁養殖計畫短期內並不影響新族群的適應性。

專題 14：利用聲學測試不同種海龜尋海的方向／Moonlight Serenade: The Role of Secondary Acoustic cues in Sea-finding by Green (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricata*), and Leatherback (*Dermochelys coriacea*) Sea Turtles

光及海浪聲是稚龜尋找海的重要因素，海龜可接收的音頻為 50-1600Hz，最敏感的區段為 50-400Hz，而海浪的音頻則大於 1000Hz，似乎超過稚龜較的敏感區段，顯示波浪拍打沙灘的聲音可能是稚龜的第 2 個輔助提示。本研究利用革龜、綠蠵龜及玳瑁稚龜，在錄製的海灘衝擊聲及模擬月光的情況下，進行海龜下海方向的實驗，分為聲音與月亮同方向、反方向及垂直 90 度角方向。結論顯示革龜及綠蠵龜稚龜尋海方向不受沙灘海浪聲的影響，但玳瑁則需進一步驗證與海浪聲的顯著關係。

專題 15：革龜與赤蠵龜的視覺感知差異與海龜行為變化的關聯性／Differences in Visual Perception are Correlated with Variation in Seafinding Behavior between Hatchling Leatherback (*Dermochelys coriacea*) and Loggerhead (*Caretta caretta*) Marine Turtles

本研究利用 33 隻革龜及 24 隻赤蠵龜的稚龜，探討稚龜尋海過程的行為差異，例如抵達海洋的時間、整體方位角及繞圈次數等，結果顯示革龜對於光線的強度區分顯著高於赤蠵龜，在新月時革龜繞圈的次數顯著增加，但在滿月時兩種海龜無顯著差異，皆可直線爬行入海，幾乎無繞圈。革龜繞圈次數的增加會提高暴露及被捕食的風險，但又因為視覺的敏感度，增強了尋找獵物、配偶及棲地的能力。

主題 4：族群生物學及監測

著重於族群統計（存活率、成長率及繁殖率）、豐度及趨勢、族群結構及流通性、群體遺傳學（例如混合種群分析）等，亦包含產卵及覓食棲地的研究與族群生物學模型、長期監測計畫及產卵族群的短期評估，提供族群結構分析的新方式。

專題 1：龜的世界基因組計畫／Sea Turtle of the World Genome project

本研究從保育的角度分析了海龜的基因組，研究其族群數量的歷史及其他參數，更多的相關訊息可參考同主題的專題 25－革龜及綠蠵龜基因組分析顯示其適應力及族群數量歷史的差異（Analysis of Leatherback and Green Turtle Genomes Reveal Differential Adaptive Capacity and Demographic Histories），也可以參考目前審核中的手稿。本研究目標為完成 7 個基因組測序，目前已完成 2 個基因組、3 個基因組正在進行中，預計到 2022 年中將所有樣本交給 BTL？2022 年底或最遲 2023 年初完成 5-7 個基因組，2023 年中完成 7 個基因組並計劃第一次的基因組分析培訓。

專題 2：西南印度洋青年綠蠵龜的海景遺傳學及空間生態學／Sea Scape Genetics and the Spatial Ecology of Juvenile Green Turtles in the Southwest Indian Ocean

西南印度洋（SWIO）有綠蠵龜、玳瑁、赤蠵龜、欖蠵龜及革龜等 5 種海龜，其中以綠蠵龜數量最多（每年約可觀察到 3.5-5 萬隻），產卵棲地主要位於獨立島嶼，較少於非洲本島沿岸產卵，在 2007 及 2015 年的調查共有 15 個產卵場；青年龜族群分為北、中、南 3 個基因群，其中「南部」及「中北部」的基因差異較明顯；本研究結合分子遺傳學（MSA）及海洋擴散模式，以瞭解在主要生長棲地的青年龜及產卵族群之間的關聯性，樣本來自 8 個生長區域共 359 隻青年龜。結果顯示北部族群僅有 3-6%來自較南方的區域，北部產卵場少於 3%的卵窩來自中、南部基因群海龜；中部族群有高達 20-92%來自所有的覓食棲地（Europa 及 Juan de Nova 除外），並含有大規模的產卵族群（每年約有 2 萬隻產卵母龜）；南部族群有 39-74%來自當地南部的覓食棲地，Europa 是最主要的產卵棲地之一（每年約有 8 千隻產卵母龜）。

專題 3：海洋暖化的基因組學：地中海赤蠵龜產卵族群的結構及適應性／Genomics on a Warming Sea: Structuring and Adaptation of the Mediterranean Loggerhead (*Caretta caretta*) Nesting Populations

地中海的赤蠵龜目前正加速滅絕中，現有的保育措施仍不足，且海龜在面對全球暖化較為敏感，尤其地中海區域受影響較大，目前赤蠵龜的基因結構仍未完全被解析，地中海的赤蠵龜產卵族群有強大的基因結構，已知雄性或雌性赤蠵龜皆有高忠誠度（philopatry），適應性（adaptation）訊號包含環境（溫度及鹽度等）、覓食行為、稚龜擴散模式及平均卵窩大小等，為保育基因學研究的新元素。

本研究探討適應性（adaptation）在赤蠵龜族群結構中所扮演的角色，樣本來自 11 個族群共 243 隻赤蠵龜，結果顯示幾乎所有族群的基因皆有所不同，有些具有特

定的基因組潛力，有些可作為不同族群間基因的聯繫，有些為獨立且低族群數量者，為維持有效的族群數量及基因多樣性，必須保護幾乎所有的族群並保存至少 90%的基因潛力。基因組學可用來評估非固定模式的生物族群，為海龜的保育及管理提供了新的研究方式。

專題 4：以生物電阻分析準確估計綠蠵龜脂肪組織含量／Bioelectrical Impedance Analysis Accurately Estimates Adipose Tissue Mass in Green Turtles (*Chelonia mydas*)

脂肪組織含量為判定海龜健康度的指標之一，脂肪組織在儲存能量、抵禦寒冷、繁殖及產生分子訊號等扮演重要角色，估計脂肪組織含量的方法包含生物電阻分析（bioelectrical impedance analysis，BIA）、影像學診斷例如電腦斷層（computed tomography，CT），生物電阻分析（BIA）有可攜帶、安全、費用相對可負擔（約 3000 美元）、結果產出迅速（幾秒內）等優點，但儀器需一段時間與電腦斷層（CT）進行比較校正。生物電阻分析（BIA）是綠蠵龜族群健康評估的一種精準方法，可準確的評估脂肪組織含量，以作為主觀判斷健康度的替代方式，但溫度必須標準化在 25-30℃之間。

專題 5：優化無人機調查的海龜數量估算方法／Optimising Methodologies for Assessing Turtle Numbers in Drone Surveys

本研究在西印度洋的查哥斯群島（Chagos Archipelago）位於保護區內的 55 座島嶼及環礁進行空拍調查，利用無人機在地平面上（above ground level，AGL）30 公尺、平行且距離海岸線 100 處，以 5 公尺/秒的速度每間隔 4 公里拍攝 1 公里。

在綠蠵龜及玳瑁的區分方面，可參考體型大小及背甲直線長（SCL）/背甲直線寬（SCW）比例，玳瑁的背甲直線長（SCL）通常小於 75 公分，綠蠵龜 SCL/ SCW 比例約為 1.2-1.29，玳瑁比例約為 1.23-1.32，準確度可達 75%。

本研究共辨識出 381 隻海龜，89%在較淺且清澈的水域，強光及湧浪的情況小於 10%。無人機是現場觀察海龜的有效工具，且影像可永久儲存重複觀看，但需考慮人工辨識的誤差、現場狀況（Wi-Fi、電池壽命、風向及大小）、資料儲存空間及分析時間等，可讓 1 位觀察者盲目重複或讓多個觀察者重複計數來提高準確度。

專題 6：首次以骨骼年代學估計澳大利亞特有種平背龜的特定年齡活存率／First Age-specific Vital Rate Estimates for Australia’s Endemic Flatback Sea Turtle (*Natator depressus*) by Skeletochronology

骨骼年代學（Skeletochronology）是一種透過計算骨骼組織內生長停滯線（Lines of Arrested Growth，LAGs）來估算脊椎動物年齡的技術，本研究利用骨骼年代學來來了解平背龜年齡與體型大小、年齡與性成熟（Age-at-Sexual-Maturity，ASM）、體型大小與性成熟（Size-at-Sexual-Maturity，SSM）之間的關係。

剛孵化的稚龜背甲曲線長（CCL）約 6 公分，1 年後背甲曲線長約 25 公分，8 年後約為 50 公分；成熟年齡平均 16.3±0.5 年（範圍 12-23 年），成熟龜的背甲曲線長平均 84.9±0.9 公分（範圍 76.1-94 公分），目前記錄到的最長繁殖壽命達 31 年。骨骼年代學可建立海龜年齡、體型大小及性成熟時間等的相互關係，這些資訊有助於族群現況的評估及保育管理措施的規劃。

專題 7：圈養的綠蠵龜族群的生殖衰退／Reproductive Senescence in a Captive Green Turtle Population

為了解海龜是否會隨著年齡增長而有生殖衰退的情形，以及母龜在停止繁殖後剩餘壽命的長短，本研究收集 1973-2018 年開曼海龜中心 118 隻已知年齡且繁殖過的海龜資料。結果顯示母龜並無明顯隨著年齡增長而繁殖力下降的情形，但某些個體有緩慢衰退的狀況；此外在母龜停止繁殖後仍可存活滿長一段時間，本研究中停止繁殖至死亡平均 3.2±2.4 年（範圍 1-9 年），在觀察到最後一次繁殖至資料收集結束平均 3.2±4.8 年（範圍 1-22 年）。未來規劃在野外自然環境進行類似研究，以進一步了解野外海龜生殖衰退情形。

專題 8：使用混合分子標記對中太平洋青年綠蠵龜進行遺傳分析／Genetic Assignment of Juvenile Green Turtle in the Central Pacific Using Mixed Molecular Markers

相較於其他種類海龜，綠蠵龜較頻繁游動及下潛，未成年的綠蠵龜經常待在馬尾藻床，並曾被觀察到會待在遠洋區 3-5 年。為了解不同生殖群系的綠蠵龜在太平洋被混獲的比例，以及能否藉由混合分子標記增進混合群系分析的精準度，本研究於 1996-2017 年間收集了在夏威夷及薩摩亞（Samoa）周邊海域被混獲的 45 隻海龜（背甲曲線長 27-78 公分），並利用粒腺體所控制的基因序列及 9 個微型衛星點位進行分析，結果顯示粒腺體 DNA（mtDNA）及微型衛星點位皆可增進群系分析的精準度，此外本次收集的混獲綠蠵龜主要來自東、西、中太平洋群系。

專題 9：墨西哥錫那羅亞州南部欖蠵龜卵窩的遺傳學研究，顯示高度的多重親緣性與優勢雄性的低出現率／Genetic Study of Olive Ridley Nests in Southern Sinaloa, Mexico, Reveals one of the Highest Levels of Multiple Paternity and Low Incidence of Dominant Males

海龜通常為一妻多夫制（poliandry），即多重親緣性（Multiple Paternity，MP），最常見的為 2 隻雄龜配 1 隻母龜，作用性別比（operational sex ratio，OSR）為具有競爭性可交配的雄雌性比例，或可受精的雌性與性活躍的雄性的比例，並不等於稚龜性別比。欖蠵龜集體產卵（Arribada）時與單獨產卵時相比多重親緣性（MP）較高，微型衛星標記為理想的親緣性研究方法，本次藉由標記評估特定地區的欖蠵龜繁殖情形，收集了 13 隻產卵母龜、214 隻孵化稚龜（每窩卵 20-30 隻）。

結果發現所有的卵窩皆有多重親緣性（MP），並辨識出 52 隻不同的親代龜，雄性：雌性的有效性別比（OSR）為 4：1，推測在交配地區的雄龜與該族群全部雄龜相比較為密集；此外多數卵窩無單一強勢的雄龜基因，顯示該族群多數雄龜皆有較平均的貢獻，有利於基因多樣性，推測短時間多次的交配有利於精液的混合；另外也觀察到一夫多妻制（polygyny）的情形，67-90%雄龜只與 1 隻母龜交配，6-31%雄龜曾與 2 隻母龜交配，2-4%雄龜曾與 3 隻母龜交配。多重親緣性（MP）可增加基因的多樣性及族群的雜合性，並減少性別比失衡對族群的影響，本實驗方式可較確實掌控特定區域實際可繁殖的公母龜，並有助於了解當地保育現況。

專題 10：透過對產卵沙灘爬痕及海水的非侵入性環境 DNA 分析監測海龜及其病原體／From a Grain of Sand: Monitoring Sea Turtle and Their Pathogens via Non-invasive Environmental DNA Analysis of Nesting Beach Sand Tracks and Oceanic Water

相較於捉放及實地觀察等傳統的物種調查方式，新的分子基因技術更具潛力，環境 DNA（eDNA）技術可從沙灘及水中監測病毒及海龜種類，為非侵入性且無需目擊標的物種，適用於水中族群、產卵族群、基因分析及病原偵測等。例如在海龜產卵沙灘可得知爬痕來自哪隻母龜、可能引起纖維乳突瘤（FP）的病毒基因，並偵測病原為來自母龜、卵窩或稚龜爬行的過程等。

專題 11：利用表觀遺傳時鐘預測海龜年齡／Age Prediction of Marine Turtles with an Epigenetic Clock

以骨骼年代學（Skeletochronology）推估年齡僅能用於在死亡海龜，表觀遺傳時鐘（Epigenetic Clock）是一種可用於推估年齡的生化測試，藉由測量 DNA 甲基化的程度。本研究樣本來自開曼群島及留尼旺島的 63 隻年齡 1-43 年的海龜，採取 DNA 後進行亞硫酸鹽定序（reduced representation bisulfite sequencing，RRBS），並針對 884 個年齡相關的 CpG 點位進行分析；此外也在寧格羅海岸的 250 隻綠蠵龜完成了年齡預測，未來會持續增加樣本數，目標為利用大數據蒐集年齡結構，進而評估整個族群結構及增長率，以期更廣泛的運用於野生動物保育及管理。

專題 12：海龜雜交種：南大西洋族群古代與近代的雜交模式／Sea Turtle Hybrids: Ancient and Recent Hybridization Patterns in the South Atlantic Ocean from Whole Genomes

海龜科（Cheloniidae）的 5 種海龜（綠蠵龜、赤蠵龜、欖蠵龜、肯氏龜、玳瑁）已長時間被認為會互相雜交，本研究透過基因組定序、系統發生學（phylogenetic）及族群分析，以了解南大西洋族群古代與近代的雜交模式。

專題 13：追踪在澳大利亞東南部海域覓食的綠蠵龜的原生起源／Tracing the Natal Origins of Green Turtles Foraging in Waters off Southeastern Australia

利用約 770bp 的粒腺體控制基因序列，追踪在澳大利亞東南部海域覓食的綠蠵龜的原生起源（種群與覓食棲地的連結性），樣本來自 257 隻青年至成年海龜及 21 隻孵化稚龜，研究顯示新南威爾斯州（New South Wales，NSW）種群來自多處，主要來自南大堡礁（Great Barrier Reef，GBR）及新喀里多尼亞（New Caledonia），種群中各年齡層的來源主要受地理上的距離及洋流影響，南昆士蘭種群也有類似的基因多樣性來源。

專題 14：透過公民科學家了解臺灣覓食海龜的分布、數量及主要威脅／Citizen Scientists Reveal the Distribution, Abundance, and Main Threats to the Foraging Sea Turtles in Taiwan

根據歷年臺灣琉球嶼相片辨識（photoo-ID）的綠蠵龜覓食族群調查，2011-2017 年共觀察到 432 隻海龜，其中有 90%停留不到 1 年，有 7%以下停留超過 7 年，顯示琉球嶼為未成年綠蠵龜成長中繼站及覓食地。本研究自 2017 年起結合 photoo-ID 與公民科學家，鼓勵民眾拍照上傳 FB 海龜點點名（TurtleSpot Taiwan），相片經審核後納入研究資料並回應通報民眾，會不定期更新海龜現況及製作相片集。

2017 年 6 月至 2021 年 12 月共收集了來自 415 位參與共 3447 筆的目擊資料，共目擊綠蠵龜 705 次、玳瑁 35 次、欖蠵龜 1 次，公：母比例為 1.58：1，並藉由重複目擊頻率估算停留時間（Minimum Residency Duration，MRD），其中 21%的海龜會停留超過 3 年，目前的最高紀錄為停留 3502 天。此外發現琉球嶼的海龜中有 16.4%（54 隻）外觀異常，最常見的依序為殼損傷（33%）、四肢損傷（27%）、漁線纏繞（13%）及腫瘤（9%）等，2020 年曾有報告指出希臘拉加納斯（Laganas）海岸的赤蠵龜有 30%曾遭螺旋槳及船隻撞擊導致受傷或死亡，顯示船隻限速及螺旋槳護具是非常有幫助的。透過本研究可初步了解臺灣多處海龜覓食棲地現況，並可作為人為威脅程度及損傷復原過程的參考。

專題 15：日本小笠原群島綠蠵龜的成長階段及性別結構動態模式統計／Statistical Estimation of Stage-and-Sex-structured Population Dynamics Models for the Green Sea Turtles in the Ogasawara Islands, Japan

日本小笠原群島的綠蠵龜族群曾因過度獵捕而大量減少面臨滅絕風險，後來在持續的保護及管理措施下穩定恢復，但近年來尚無針對族群的量化評估及漁業影響調查，為初步了解族群現況並尋求保育及永續利用的方式，本研究建立了成長階段及性別結構的動態模式，根據一系列的公式可估算各成長階段及性別比例的消長。將持續測試公式參數的敏感度，並加入時間、溫度、密度等變因及混獲致死率，以期建立完整的管理策略評估（Management Strategy Evaluation，MSE），包含穩定的保育策略及回饋機制等。

主題 5：漁業及威脅

重點為評估造成海龜棲地條件下降的自然及人為威脅，或增加海龜死亡及族群減少的風險，包含漁業混獲、漁具特徵及努力量、任何因素造成的擱淺（凍暈等）、產卵及覓食棲地退化、沿海城市發展、氣候變遷、已知或新發現的潛在威脅，提出降低海龜族群風險建議或實際採取的措施，以科學的方式進行研究並分享新方法、技術及分析結果。

專題 1：新喀里多尼亞 20 年的海龜擱淺紀錄／Twenty Years of Sea Turtle Strandings in New Caledonia

新喀里多尼亞是位於大洋洲西南部的法國海外領地，從 1999 年至 2021 年 3 月共紀錄了 406 隻擱淺海龜，包括綠蠵龜、玳瑁、赤蠵龜、欖蠵龜、革龜，以綠蠵龜為主（佔 68 %），84%的擱淺推測為人為因素造成，多發生於每年 11 月至隔年 1 月，並以背甲長 35~65 公分的青年龜為主。50%海龜為活體擱淺，但約有半數在 24 小時內死亡，釋回海中前的恢復期平均為 70 天，全部約有 35%海龜成功釋回野外。

漁業混獲為新喀里多尼亞海龜擱淺的主因之一，分為沿岸漁業及遠洋漁業；沿岸漁業包括蟹籠及圍網，共發現 36 隻擱淺海龜因而死亡；遠洋漁業每年約有 20 艘延繩釣漁船，平均每年不到 1 頭海龜被混獲且有 50%存活釋回。擱淺紀錄中有 38 隻遭船隻撞擊且 50%位於保護區內，另有 2 隻綠蠵龜被發現可能死於食入過多塑膠製品，胃內除了有大量塑膠外還有胃穿孔的情形，此外在 2011-2020 年間發現 11 隻有纖維乳突瘤感染的海龜。

專題 2：韓國海域海龜食入的塑膠碎片分析：數量、形狀、來源及組成／Plastic Debris Ingested by Sea Turtles from the Korean Waters: Quantity, Shape, Origins, and Polymer Composition

世界上現存的 7 種海龜都受到誤食海洋廢棄物或被纏繞的影響，因其食道內壁長滿倒刺狀的肉突故難以將廢棄物嘔出，久存的廢棄物不只造成物理性影響，也可能有化學物質釋出。全球海洋廢棄物有 86%來自亞洲的河流，塑膠的製造只有少數來自西北太平洋，但西北及中太平洋卻是海龜誤食廢棄物的熱點。

本研究利用 2012-2020 年 56 隻冷凍的海龜屍體（包括赤蠵龜 32 隻、綠蠵龜 18 隻、革龜 3 隻、欖蠵龜 2 隻、玳瑁 1 隻），進行剖檢及採樣（包括外觀體徵測量、X 光、解剖取樣、蒐集塑膠碎片、過濾/清洗/冷凍乾燥、測量質量/尺寸/形狀/顏色等、化學成分分析），發現誤食塑膠碎片的盛行率 86%（48/56 隻海龜）。結果顯示赤蠵龜及綠蠵龜體內常見大量的塑膠碎片或廢棄物，多為單次使用（拋棄式）用品及漁業廢棄物，不同物種腸胃道中不同種類及數量的塑膠或廢棄物，推測可能與其活動範圍及攝食習慣有關。

專題 3：意外捕獲的平背龜之魚鉤類型調查／Prevalence of Fishing Hook Type in Incidental Capture of Kemp's Ridley (*Lepidocheyls kempii*) Sea Turtles

2016-2020 年樣本中近 1/3 的魚鉤位於食道中段，J 形鉤為主要的魚鉤類型（應推行混獲減輕策略以圓形鉤替代 J 形鉤），有 1 隻海龜被釋放時體內可能還有圓形鉤或卡勒鉤，89 隻海龜中只有 2 隻在醫院死亡（1 隻為 J 形鉤在食道、1 隻為圓形鉤在口腔），97.8%的海龜成功恢復並釋回大海。

專題 4：海龜的新威脅：衝擊波創傷導致的大量擱淺／New Threat on Sea Turtles: Mass Stranding of Turtles Suffering from Shock Wave Trauma

本研究欲探究地震探測的空氣槍與海龜大量擱淺的關聯性，但結果顯示無科學證據證明地震探測的空氣槍有足夠的強度造成衝擊波創傷，海洋學模式無法將地震探測的地點與擱淺地點連結，進而無法確定地震探測為主因；本研究也同時監測其他水下脈衝噪音來源例如聲納、軍事或漁業的爆破或閃光風暴等，但亦無法確定其關聯性。故目前皆無法確定海龜的死亡案例為上述特定原因造成，但仍提供了一些改良方針，以期減少人為聲學活動對海龜的負面影響；此外亦開發了新聲學辨識技術：藉由即時聲波圖監測大型動物群體，此技術在試驗室完成並成功在海上監測到 100 公尺以外的海龜；以下提供一些威脅減輕建議：

1. 減少地震探測對海洋生物的影響，例如培訓海洋哺乳動物觀察員、降低空氣槍發射強度等
2. 藉由海洋地理學預測海龜可能受影響的地點，以便進行海岸或海洋保育研究。
3. 在專屬經濟區（EEZ）內進行時空分布研究。
4. 由工程公司進行聲學研究及環境補償：前期先找出施工的最佳時機，施工期間避免高風險區內的海龜受到傷害，後期蒐集受傷及死亡的海龜由特定船隻運送到救援中心。

專題 5：西地中海未孵化赤蠵龜卵中的假單胞菌科及腸桿菌科抗藥性菌株／Antibiotic-resistance of Pseudomonadaceae and Enterobacteriaceae Isolated from Unhatched Eggs of Loggerhead Sea Turtles in the Western Mediterranean

細菌對抗生素的抗藥性可能會迅速傳播並影響其棲地的其他物種（例如會攝食海龜卵的動物），本研究推測海龜可作為抗藥性菌株的潛在帶原者，也是生態系中人為壓力的哨兵物種，龜卵中的抗藥性菌株可能來自環境或產卵母龜；抗藥性基因會在不同的菌種間轉移，包含對其他動物及人類健康有潛在影響的致病菌種，其中腸桿菌科可能為抗藥性基因的重要攜帶者。下一步研究應為尋找抗藥性菌株的來源，以及對胚胎發育、微生物群系的成熟及免疫系統的影響。

專題 6：美國大西洋鮟鱇魚刺網漁業針對減少海龜混獲的底刺網比較研究／Comparative Study of a Bottom-set Gillnet Designed to Reduce Sea Turtle Bycatch in the U.S. Mid-atlantic Monkfish Gillnet Fishery

2011-2013 年的研究已發現調降底刺網的高度可減少混獲，本研究加入其他變因包含放置深度、放置時間、溫差及風速等，結果顯示刺網類型仍為影響混獲的主要變因，調降底刺網高度可減少 68%的赤蠵龜混獲。本研究進一步以水下錄影觀察海龜是否利用視覺避開刺網，結果發現海龜即使未看到而撞上刺網，調降高度的刺網高度仍可使海龜較輕易的逃脫。

專題 7：海龜與網具互動行為的直接監測／Direct Behavioral Measurements of Sea Turtle Interactions with Fishing Gear: a Peek into the Bycatch Black Box

為直接觀察海龜與網具的互動，本研究利用人工水道設計了兩個讓海龜選擇的路徑並放置攝影機，並於其中一個路徑放置網具，比較 15 隻赤蠵龜及 16 隻綠蠵龜在白天與網具互動的情形，分為直接後退（reversal）、U 形迴避（U-turn）、與網具互動（net interaction）及被纏繞（entanglement）等 4 種行為。結果顯示赤蠵龜最少出現 U 形迴避，其餘 3 種行為發生率相近；綠蠵龜最少被纏繞，其餘 3 種行為發生率相近；未來將在晚上重複此實驗，並比較光源的有無、方向、位置、是否閃爍及其頻率等對海龜行為的影響。

專題 8：義大利西南海岸的海龜擱淺趨勢／Trends in Sea Turtle Stranding along the South Western Italian Coasts

本研究地點位於義大利坎帕尼亞（Campania）的海岸，在 2007-2021 年間共發現 319 隻活體擱淺海龜及 842 隻死亡擱淺案例，其中活體擱淺原因多為漁業混獲，除了 10 月份案例較少外，其餘月份發生率相近；死亡擱淺原因多不明，5-8 月發生率較高，10 月份最；擱淺發現地點多在港口附近，但可能並非混獲實際發生地點，且可能存在一些非法捕魚的船隻。經過 15 年的監測我們知道何時、何處及合作對象以減少海龜混獲問題，但如何合作才是問題，必須聯合法漁民共同抑制非法漁業。

專題 9：東北大西洋遠洋延繩釣的海龜意外捕獲／Incidental Capture of Sea Turtles in the North-east Atlantic Portuguese Pelagic Longline Fishery

海龜在劍魚季有較高的混獲率且會聚集在較高漁業努力量的區域，赤蠵龜及革龜的混獲熱點在時間上重疊（皆於秋季）但在地點未重疊，赤蠵龜在東北太平洋的遠洋延繩釣漁業中混獲死亡率約為 4-30%，如何減少延繩釣的混獲及死亡率：1) 漁業活動管理：部分時間或區域的漁業活動禁止、網具類型的改良；2) 提升漁業作業人員的保育意識：辦理會議及工作坊、尋求最佳解決方案、提供適當的設備以處理及釋回混獲的海龜。

專題 10：基於海龜族群的全球移動軌跡對氣候的易感性評估／A Global Trait-based Climate Vulnerability Assessment for Sea Turtle Populations

易感性評估應包含曝露程度（exposure）、敏感度（sensitivity）及適應能力（adaptive capacity），主要的氣候曝露驅動因子包括海表溫度、氣溫、海水酸化、溶氧等，主要的氣候敏感度驅動因子包括卵窩及卵對溫度的敏感度、產卵的地理範圍、產卵地的忠誠度、累積的壓力因子、族群豐度趨勢，未來要做的包含提供相關資訊以利管理及保育行動、挑選優先群體進行進一步的模式化及研究、找出數據缺口、為其他研究及管理措施提供協助。

主題 6：保育、管理及政策

介紹關於海龜的經濟、法律、政策及管理方面的保育工作，包含棲地的執法、監測、相關倡議及國際協定的實施、結果及影響。

專題 1：包含海龜、海鳥及遷徙濱鳥在內的野生動物光污染指南／Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds

人造光源會干擾海龜的行為，產卵母龜可能因岸上的人造光源而遠離該沙灘，孵化的雉龜則會找不到海的方向且增加被捕食的機率，最近的研究也顯示雉龜在海中會受海上光源的吸引而聚集，增加被捕食的風險。

澳洲政府發表了包含海龜、海鳥及遷徙濱鳥在內的野生動物光污染指南，以提升大眾對於人造光源可能對海龜造成潛在影響的認識，並為評估及管理重要產卵沙灘附近的影響提供規範。澳洲政府也將該指南在保護野生動物遷徙物種公約第 13 屆締約方會議（CMSCOP13）中發表，並由保護野生動物遷徙物種公約（CMS）秘書處要求將該指南加入附屬協議中進行推廣。

專題 2：澳大利亞透過與原住民的合作取得海龜保育成果／Sea turtle Conservation and Social Outcomes through Indigenous Initiatives and Collaborations in Australia

一個長期保育計畫的成功通常建立於當地利害關係者，因為自然資產亦包含內在、文化及價值觀，澳洲原住民在傳說、食物、儀式、歌曲、故事、舞蹈、藝術、健康及保育等方面，皆與海龜有著錯綜複雜的文化聯繫，過去的 30 年間，澳洲政府不斷改變對原主民的態度及政策，增加了對當地管理的支持，包含建立雙向知識系統及共同管理的保護區。澳洲的進展為許多因素所促成，包含 1993 年通過的《原住民土地權利法》維護了原住民的權益，不禁止狩獵、捕魚、採集或相關文化及精神活動（包含獵捕海龜），許多團體制定了社區管理計畫，確保以資源永續的方式滿足其文化需求。

過去的 20 年間，澳大利亞保護區網絡持續擴展，許多保護區由政府與原住民團體共同管理，至 1999 年已增加到 78 個原住民保護區（Indigenous Protected Areas，IPAs），由原住民團體進行保護區內（含陸域及海域）的生物多樣性及文化的經營管理。澳洲的海龜復育計畫也是與原住民合作的成果，例如西北岸平背龜保育計畫（NWSFTCP）與超過 13 個原住民團體合作，也提供了就業及教育機會。

專題 3：極度貧困的印尼巴布亞（Papua）的革龜保育計畫為當地社區帶來的好處／Benefits of a Leatherback Conservation Project to Local Communities in an Extremely Poor region in Papua, Indonesia

西太平洋的革龜每年有超過 75%以上的產卵行為都發生在巴布亞（Papua）的 Jamursba Medi 及 Wermon 沙灘，但自 1980 年代起該處革龜的數量每年皆下降超過

60%，因為在 1970-1990 年間有大量的龜卵被人類利用，儘管現在當地社區不再依靠採卵獲取收入，州立巴布亞大學（UNIPA）以革龜保育計畫在當地進行研究及保育，在 2019-2020 年間提供產卵棲地附近居民接受教育的機會。

專題 4：柬埔寨的海龜保育：進展與挑戰／Sea Turtle Conservation in Cambodia: Progress and Challenges

柬埔寨沿岸曾有 5 種海龜被記錄，分別為綠蠵龜、玳瑁、欖蠵龜、赤蠵龜及革龜，但數量都顯著下降中，面臨漁業混獲、產卵沙灘與覓食棲地減少、海洋汙染及少量人類食用等威脅，近幾年僅記錄到綠蠵龜及玳瑁。當地的海龜保育工作在 2010 年起由「野生動植物保護國際」（Fauna & Flora International，FFI）與柬埔寨政府漁業管理局進行合作，在漁業混獲部分透過與當地漁民的接觸，了解海龜混獲的頻率及地點；自 2010 年起混獲的海龜會被上標並釋放，迄今共有 174 隻海龜混獲後被釋放，其中 26%是曾被標放過的；在 2021 年由自願者進行產卵沙灘巡查共 160 公里，雖然並無發現產卵母龜；在 2022 年有另一項計畫，將評估海龜混獲的時空變化並提出保育策略。

保育宣導方面，2019 年 10 月至 2020 年 7 月已在 9 個沿海村落辦理 3 場次宣導活動，內容包含瀕危海龜的介紹，後來受到 COVID-19 影響，以海報張貼的方式在沿近海漁村社區及各釣點傳遞相關訊；另一關鍵優先事項為在拖網漁船裝設海龜逃脫器（Turtle Excluder Device，TED），需確保漁業部門的支持，讓海龜在被拖網漁船誤捕時能夠脫困。

專題 5：利用衛星追蹤為跨洋區及區域性保育提供訊息／Using Satellite Tracking to Inform Conservation across Ocean Basins as well as at Local Levels

衛星追蹤被廣泛應用於觀察海龜移動路徑，有助於大面積的海洋保護區及其他重要區域（例如海龜頻繁利用的覓食棲地）的經營管理，其中數據共享更助於最大限度的提升保護效益。

專題 6：位於地中海的第勒尼安海（Tyrrhenian）赤蠵龜面臨海上交通風險增加的遠洋區域／Pelagic Areas with Increased Risk of Exposure to Maritime Traffic for Loggerhead Turtles in the Tyrrhenian (Mediterranean) Sea

全球船舶碰撞海洋生物的事件逐年增加，對於大型鯨類及海龜皆是重大威脅，因為海龜會上升到水面換氣或接近水面休息，但目前船舶碰撞對海龜的危害研究僅著重於近岸。本研究以衛星追蹤資料取得海龜在遠洋區待在水面的時間，與大型船舶的航線進行分析，顯示在第勒尼安海（Tyrrhenian）西部海域的赤蠵龜，平均核心活動範圍有 64%與相對高密度的水上交通重疊，尤其在秋冬季節，通常是貨輪及客船，為通過墨西拿海峽或連接西西里島與大陸的全球航線。本研究為首次在遠洋棲地對赤蠵龜與海上交通航線進行空間風險評估，並概述了衛星遙測資料對高度洄游生物運動模式的直接觀察結果。

專題 7：降雨在氣候暖化中調節海龜孵化性別比及確定繁殖性別比的重要性／The Importance of Rainfall in Modulating Hatchling Sex-ratios and Determining Breeding Sex-ratios of Sea turtle Populations in a Warming Climate

近幾年全球氣候暖化改變了降雨頻率，亦使一些物種及生態系受到影響，在許多熱帶地區，暴雨頻率會隨著氣溫升高而增加，氣溫每升高 1℃，降雨機率即增加 7%，在亞太地區的綠蠵龜與玳瑁則是有稚龜雌性化的現象。世界自然基金會－澳洲海龜降溫計畫（WWF-Australia Turtle Cooling Project），目標在於：1) 確認玳瑁及綠蠵龜的主要產卵沙灘的暴雨事件對稚龜孵化性別化的影響，尤其在亞太地區；2) 使用卵窩及氣溫數據，根據過去與未來的孵化性別比例模型，評估稚龜雌性化對該族群的相對威脅；3) 使用無人機（UAV）調查大堡礁南部一個具有區域意義的綠蠵龜產卵場的性別比。

專題 8：使用海水澆灌提高海龜雄性孵化比例／Increasing Male Hatchling Production Using Seawater Irrigation

世界自然基金會－澳洲海龜降溫計畫（WWF-Australia Turtle Cooling Project），以淡水及海水澆灌卵窩，觀察其孵化率及孵化性別比，結果顯示淡水及海水澆灌可降低卵窩溫度 1-1.5℃，增加雄性孵化的比例，但在孵化率上無顯著差異（控制組 70%、淡水組 82%、海水組 74%)；其中淡水澆灌增加雄性孵化率較海水高，而海水澆灌 200 毫升增加雄性孵化率較 100 毫升高，故如欲使用一次性海水澆灌增加雄性孵化率，建議使用 200 毫升，在實驗中雄性增加了 5 倍且孵化率不受影響。

專題 9：改善產卵場管理以減緩產卵季節改變對印度西岸欖蠵龜的影響／Improvisation of Hatchery Management Practice to Mitigate the Impact of the Shift in the Nesting Season of Olive Ridley Turtles on the West Coast of India

海水溫度的增加影響了海龜的產卵行為，印度西岸欖蠵龜的繁殖季節由冬天轉變為夏天，高溫增加了胚胎死亡率，且掠食性及攻擊性生物增加，使卵窩孵化完全失敗，也增加了稚龜的雌性比例。

專題 10：SEE SHELL：檢測玳瑁再製品的深度學習模型／SEE SHELL: A Deep Learning Model for Detecting Hawksbill Derived Products

利用玳瑁影像資料庫，訓練電腦來判別產品是否為玳瑁龜甲的再製品並開發 APP，輸入照片即可判別是否為玳瑁再製品，對於防止非法販售相當有幫助。

主題7、8：教育、推廣及宣傳／社會、經濟及文化研究

為提升大眾對海龜的認識並喚起人們了解其存續的重要性，必須拓展創新且廣泛的方式推動教育宣導，進而影響決策者及改變潛在對手（例如漁民及盜獵者）的想法使其成為盟友。海龜不僅在海洋生態系中扮演重要的角色，對人類社會也至關重要，必須更廣泛探索其重要性並結合世界各地不同的文化及風俗習慣，包含社會科學及人類學相關研究，並深入了解當地的社會文化以解決衝突。

專題 1：在馬爾地夫 COVID-19 對遊客與海龜互動的影響／Still Swimming with Turtles – The Impact of COVID-19 on Tourist-Turtle Interactions in the Maldives

馬爾地夫是印度洋北部的一個島國，該國的經濟主要依靠旅遊業，在 2017 年因渡假村及遊客不斷的增加，人類的存在使海龜經常出現防衛性行為，2018 年起 Levi Anatole 在 16 個人們常去的景點進行測試，並收集以下資料：1) 隨機的互動資料、2) 海龜本來的行為、3) 海龜間的互動、4) 人與海龜間的互動，並透過潛水調查人與海龜的距離及遊客數量等。

2018-2021 年的研究顯示，相較於玳瑁，人類對綠蠵龜的影響更大，在與人類距離約小於 5-8 公尺時綠蠵龜開始有防禦行為，將持續探討綠蠵龜行為會改變的原因、活動空間有無減少、族群改變的原因（COVID-19 前的 25 隻舊龜不再被目擊，重新開放後出現 14 隻新龜）及盜獵行為等，另將增加不同的觀測點，並辨認其他可能造成影響的因素。

專題 2：透過綜合行為模式研究維德角的非法海龜貿易行為／Investigating Behaviours from Illegal Sea Turtle Trade in Cabo Verde by Adapting a Comprehensive Behavioural Model

本研究依據貿易相關的心理因素提出以下建議：

1. 保育行動應著重於改變海龜貿易背後的主觀動機（如海龜肉很美味等觀念）。
2. 提升人們保護海灘的意識。
3. 強化人們的責任感及道德感。
4. 在適當的時候，利用特定的社區夥伴關係來塑造規範性信念。

將持續評估保育措施對行為預測因素的影響，並鼓勵每個人將保育心理學整合到自己研究中。

專題 3：線上舉辦拉丁美洲海龜專家會議（RETOMALA）：疫情期間的解決方案／RETOMALA On-line: A Pertinent Solution during Pandemic Outbreak

今年度因應 COVID-19 疫情，拉丁美洲海龜專家會議（RETOMALA）亦採線上辦理，可藉此分析其優缺點。其缺點包含某些地區或國家的時差、較缺乏在地團體

的參與、部分人員並無智慧型手機和便利的社群媒體工具，且部分線上平台有關看時間及人數的限制；優點包含如果有人分享訊息就會有更多人的互動，較容易聚集人潮，這是一大優勢，且可以免費參與，在 Instagram 上錄製的內容也可以在 Twitter 或 Facebook 上共享，且可在用戶中看到歷史訊息。在經歷 COVID-19 後的新時代及新世界，線上會議可作為暫時或永久性的工具，但仍需克服一些問題。

專題 4：遊客喜歡什麼？哥斯大黎加托爾圖格羅（Tortuguero）海龜之旅令人滿意的關鍵要素／What do Tourists Like? Key Elements for a Satisfactory Turtle Tour in Tortuguero, Costa Rica

本研究中多數參與的遊客都感受到良好的體驗，主要原因包含：1) 允許人們在不過度干擾海龜的情況下進行觀察、2) 準備充分的導遊、3) 良好的資訊管理。此外仍有一些改善空間，例如 1) 進行遊客管制以避免過度擁擠、2) 更落實的執行規範（現有規範尚可但它們並不總是被遵守）、3) 導遊需要更好的準備海龜相關訊息、4) 改善對於訊息的管理（該地區的兩個經營者有時會提供舊訊息）。希望本研究有助於改善城市或商業的管理模式，並協助決策者為保育成功繼續努力。

專題 5：最後兩隻產卵綠蠵龜：激勵留尼旺島產卵沙灘的保護及宣傳／The Last two Nesting Green Sea Turtles (*Chelonia mydas*): an Incentive to Mobilize the Preservation and Advocacy of Nesting Beaches in Reunion island

永遠不要放棄努力，特別是對於像海龜這種長壽的物種，單一物種花費大量及昂貴的努力可能會受到批評，但從完整的棲地及生態系的角度來看是非常有意義的。在提升保育意識的同時，機構之間的溝通及合作是一項挑戰但也充滿了機會，必須達成共識持續進行有效及長期性的努力，例如本研究中的棲地修復，在移除大量外來植物後，漸漸恢復由本土植物取代。

三、閉幕及頒獎（Closing Remarks and Awards）

6 月 28 日的閉幕亦由國際海龜協會（ISTS）時任主席 Kellie Pendoley 進行致詞並頒發相關獎項如下：

1. 終身成就獎：

獲獎者 Alan Bolten 為 Archie Carr 海龜研究中心研究助理，於今年 3 月過世，其成就包含建立海龜的管理及標記程序，領導大西洋的赤蠵龜復育計畫並持續針對赤蠵龜數量進行監測，發表的報告包含海龜的活動頻率、產卵棲地、行為及威脅評估等，以及遠洋延繩釣混獲海龜情形及如何減少海龜被混獲之研究。

2. 基層保育獎：

本獎項授予對海龜或其棲地保育有積極貢獻的基層團體或個人，由 5 - 6 位評委以類似 Archie Carr 研究人員獎的流程進行評選，獲獎者為 Comeron Masakolo、Johnson Haro、Alec Hughes、Robert Howard、John Read 及 Katherine,Moseby 發表在所羅門群島上兩個偏遠島嶼的革龜產卵棲地保育及所面臨的威脅。

3. 研究人員獎：

Archie Carr 研究人員獎是為了紀念一位美國爬蟲、生態學家及保育主義者，為佛羅里達大學的動物學教授，在 1987 年由美國生態學會授予傑出生態學家獎，他引起了人們對由過度開發及棲地喪失而導致的全球海龜數量下降的關注。本獎項每年在國際海龜研討會頒發，以表彰各國研究生或研究人員的卓越表現，分為生物學研究及海龜保育的口述演獎及海報展示，本屆得獎者如下：

(1) 生物學口述演講獎

冠軍：Samantha Elizabeth Trail－革龜與赤蠵龜的視覺感知差異與海龜行為變化的關聯性

亞軍：Renato Saragoca Bruno－重要的大西洋覓食地－尼加拉瓜莫斯基托斯海岸雌性綠蠵龜的繁殖動態

(2) 生物學海報展示獎

冠軍：Alexandra G. Gulick－海龜覓食的加勒比海海草地床的補償性成長

亞軍：Emily Turla－海龜孵化與成長時受困比例及相互關係之研究

(3) 海龜保育口述演講獎

冠軍：Chia-Ling Fong－透過公民科學家了解臺灣覓食海龜的分布、數量及主要威脅

亞軍：Larissa Rosalie Young－使用海水澆灌提高海龜雄性孵化比例

(4) 海龜保育海報展示獎

冠軍：Gisela Marin-Capuz－維德角共和國的海龜科學上分析

亞軍：Mar lzquierdo－海洋廢物被西地中海赤蠵龜吞食的影響因子

4. Ed Drane 志願服務獎

本獎項是為了紀念在國際海龜協會（ISTS）服務 20 年以上的 Ed Drane，頒發給在自己本職之外投入海龜保育工作者，獲獎者為 Barry Gilomore，他自願為此效力不求學術或經費支持，並為海龜研究及保育做出重大貢獻。

5. 主席獎：

由國際海龜協會（ISTS）主席頒發給個人或社區、政府或非政府組織團隊的年度獎項，以表彰其在保育推動方面的傑出成就。獲獎者 Anna Vitenbergs 自 35 年前從事海龜保育育工作，並成立學校招募學員共同為海龜保育努力。

最後宣布第 41 屆國際海龜研討會（ISTS41）將於哥倫比亞卡塔赫拉（Cartagena）的 Hilton Cartagena 飯店舉辦，時間為 2023 年 3 月 18-24 日，歡迎參加者提前預訂住宿，該飯店有不同大小的場地及會議室可供使用，該城市有許多美食、自然風光、潛水及觀光景點，歡迎各位前來一同參與會議。

參、心得及建議

本次會議主辦單位採用「Gather Town」視訊軟體，可創建一個類似實體會議的空間，進行服務台、演講台及桌椅等擺設，與會者也能透過視訊或打字版單獨或與多人進行交流；相較於一般的視訊會議軟體，需要較多人力及時間成本做規劃，但能使與會者能較具臨場感及自由互動性。主題演講由來自全球各地的學術單位研究人員、專家學者、環保組織及在地民間團體等，可分享相關知識及保育行動，進一步建立網絡及合作關係等，共同推動海龜保育。

許多研究藉由區域性的長期調查，得以逐漸了解當地海龜覓食族群及產卵族群動態及趨勢，進而擬定或調整保育方針，顯示長期監測的重要性，調查方法包括裝設衛星發報器、臉部辨識（Photo-ID）及族群基因的分析比較等。在臺灣海龜的覓食棲地廣泛，其中屏東縣琉球嶼海龜的密度最高，本次會議中來自中研院的馮加伶發表了結合 photo-ID 與公民科學的研究，可初步了解臺灣多處海龜覓食棲地現況，此外停留時間較久、常被潛水教練及遊客觀察到的海龜，可能成為當地的明星，不但具有觀光價值，更能進而提升大家對海龜保育的關注度及認同感。

臺灣有穩定產卵紀錄的地方包括澎湖縣望安島、臺東縣蘭嶼、屏東縣琉球嶼、東沙環礁及南沙太平島，除了在上述地點持續進行生殖生態學調查外，臺東縣富山護漁區曾在 2019 年發現有綠蠵龜上岸產卵，亦為值得持續關注的潛在產卵棲地。本次會議中有研究指出持續受海浪的侵襲會影響胚胎死亡率、稚龜發育、體型大小及性別比例，將卵窩遷移至較安全的地區亦為保育策略之一，但若移窩地點溫度過高，會進而影響孵化率及性別比例，故移窩地點的評估及選定十分重要。

不少研究指出漁業混獲為海龜的主要威脅之一，必須持續關注混獲對海龜的威脅，進行忌避措施的研究評估，並宣導混獲海龜後正確的處理方式、提升漁業作業人員的保育意識及混獲通報率等。另對於非法貿易的相關建議包含扭轉海龜貿易背後的動機（如海龜肉很美味等觀念）、提升人們保護海灘的意識、強化人們的責任感及道德感、利用特定的社區夥伴關係來塑造規範性信念等，此外良好的生態旅遊設計應包含允許人們在不過度干擾海龜的情況下進行觀察、進行遊客管制以避免過度擁擠、良好的資訊管理及更落實的執行規範等。

會議中多次強調跨單位或領域的合作，例如由公司或支持者提供資金或行動的環境補償行動，且保育計畫應有長遠的規劃，例如留下系統性的資料及標準作業流程等。長期保育計畫的成功，需要建立與當地利害關係者良好的關係，例如澳洲原住民與海龜有著錯綜複雜的文化聯繫，促使澳洲政府不斷改變對原主民的態度及政策，包含建立雙向知識系統及共同管理的保護區，不禁止狩獵、捕魚、採集或相關文化及精神活動（包含獵捕海龜），並制定社區管理計畫，確保以資源永續的方式滿足其文化需求。

我國同樣面臨許多類似的議題，可作為後續推動相關保育行動之參考，並因地制宜配合環境現況及風俗文化等進行調整，國際會議除了分享新技術及研究成果外，也是結識合作單位、了解最新研究並討論問題解決方式的極佳機會，透過建立夥伴關係可以對未來產生更大的影響。

附錄一、會議議程

Conference Agenda

Session Overview

Date: Friday, 25/Mar/2022

1:00am - 4:00am	**Regional Meeting: RETOMALA (South America)** Location: **Meeting Room 2** Chair: **Daniela C Rojas-Cañizales** Chair: **Carmen Mejías-Balsalobre** Chair: **Jaime Restrepo** Chair: **Daniel Gonzalez-Paredes** Chair: **Jimena Gutiérrez-Lince**	
1:00am - 5:00am	**Workshop 1: Understanding and Quantifying Cumulative and Synergetic Stressors to Sea Turtles** Location: **Meeting Room 4** Chair: **Mariana Fuentes**	
5:00am - 9:00am	**Workshop 2: Combatting the Global Marine Tortoiseshell Trade** Location: **Meeting Room 2** Chair: **Brad Nahill** Chair: **Christine Anne Madden Hof** Chair: **Michael Paul Jensen** Chair: **Alexander John Robillard**	**Workshop 3: Single Species Action Plan for the Loggerhead Turtle in the South Pacific Ocean** Location: **Meeting Room 3** Chair: **Karen Arthur** Chair: **Duane March**
7:00am - 10:00am	**Regional Meeting: Oceania (Pacific)** Location: **Meeting Room 5** Chair: **Irene Kelly**	
8:00am - 12:00pm	**Workshop 4: Assessment of the Conservation Status of Hawksbill Turtles in the IOSEA Region - Launch of Publication and Introduction to TurtleNet** Location: **Meeting Room 1** Chair: **Mark Hamann** Chair: **Heidrun Frisch-Nwakanma**	**Workshop 5: Light Pollution Solutions for Sea Turtles (Sponsored by DAWE)** Location: **Meeting Room 4** Chair: **Karen Arthur** Chair: **Caesar Francisco San Miguel** Chair: **Rachel Tighe** Sponsored by: Australian Government Department of Agriculture, Water and the Environment
11:00am - 3:00pm	**Workshop 6: Bridging the Gaps: The Asia-Pacific Marine Turtle Genetic Working Group** Location: **Meeting Room 2** Chair: **Alessandro Ponzo**	
12:00pm - 3:00pm	**Regional Meeting: East Asia** Location: **Meeting Room 5** Chair: **Connie Ka Yan Ng**	
1:00pm - 5:00pm	**Workshop 7: How to Quantitatively Describe Correlations between Sea Turtle Movement and Ocean Surface Current** Location: **Meeting Room 3** Chair: **Yaoting Tseng**	
3:00pm - 6:00pm	**Regional Meeting: IOSEA (South-east Asia)** Location: **Meeting Room 5** Chair: **Lalith Ekanayake**	**Regional Meeting: Mediterranean** Location: **Meeting Room 1** Chair: **Sandra Hochscheid** Chair: **Yakup Kaska** Chair: **Aliki Panagopoulou**
4:00pm - 7:00pm	**Regional Meeting: Africa** Location: **Meeting Room 2** Chair: **Manjula Tiwari** Chair: **Angela Formia** Chair: **Andrews Agyekumhene**	
4:00pm - 8:00pm	**Workshop 8: Sea Turtle Medicine, Rehabilitation and Rescue Workshop** Location: **Meeting Room 4** Chair: **Daniela Freggi**	
7:00pm	**Workshop 9: New Partnerships towards an efficient Conservation of Sea Turtles along the Atlantic and Mediterranean coasts of Africa** Location: **Meeting Room 1**	
8:00pm	**Workshop 11: Student Committee Workshop: How to Succeed in the Turtle World and Beyond** Location: **Meeting Room 2** Chair: **Alexandra Lorraine Fireman** Chair: **Renato Saragoça Bruno** Chair: **Matthew David Ramirez**	
10:00pm	**Workshop 10: The ICAPO Network: The Eastern Pacific Hawksbill Research and Conservation: Current Status** Location: **Meeting Room 3**	

	Chair: **Ingrid Yanez**
11:00pm	**Regional Meeting: WIDECAST (Caribbean)** Location: **Meeting Room 5** Chair: **Karen Eckert**

Date: Saturday, 26/Mar/2022

	Poster Presentations 1 (Population Biology / Education, Outreach & Advocacy) Location: **Poster Room 1**	**Poster Presentations 2 (Anatomy, Physiology & Health / In-water Biology)** Location: **Poster Room 2**
	Poster Presentations 3 (Fisheries & Threats / Conservation, Management & Policy) Location: **Poster Room 3**	**Poster Presentations 4 (Nesting Biology / Social, Economic & Cultural)** Location: **Poster Room 4**
8:00am - 8:30am	**Opening Remarks** Location: **DAWE Plenary Room**	
8:30am - 9:00am	**Welcome to Country** Location: **DAWE Plenary Room**	
9:00am - 10:30am	**Keynote Presentations** Location: **DAWE Plenary Room** Chair: **Kellie Pendoley**	
10:30am - 11:00am	**BREAK**	
11:00am - 12:00pm	**Session 1: Fisheries & Threats #1** Location: **DAWE Plenary Room** Chair: **Matthew Godfrey** Chair: **Peter Bradley Richardson**	
12:00pm - 12:15pm	**Session 1: Question & Answer** Location: **DAWE Plenary Room**	
12:15pm - 12:30pm	**BREAK**	
12:30pm - 1:30pm	**Session 2: Nesting Biology (Ecology, Behaviour and Reproductive Success) #1** Location: **DAWE Plenary Room** Chair: **Michael Paul Jensen** Chair: **Jérôme Bourjea** Chair: **Mayeul Dalleau** Chair: **Kelly Stewart**	
1:30pm - 1:45pm	**Session 2: Question & Answer** Location: **DAWE Plenary Room**	
1:45pm - 2:15pm	**BREAK**	
2:15pm - 3:15pm	**Session 3: In-water Biology (Behaviour, Ecology, Migration, Telemetry, and Foraging) #1 (Sponsored by AIMS)** Location: **DAWE Plenary Room** Chair: **Anton D Tucker** Chair: **Ana Rita Patrício** Chair: **Alan Rees** Chair: **George Shillinger** Chair: **Jeanette Wyneken** Sponsored by: Australian Institute of Marine Science	
3:15pm - 3:30pm	**Session 3: Question & Answer** Location: **DAWE Plenary Room**	
3:30pm - 3:45pm	**BREAK**	
3:45pm - 4:45pm	**Session 4: Population Biology and Monitoring (Status, Modelling, Demography, Genetics, Nesting Trends, and In-water Trends) #1** Location: **DAWE Plenary Room** Chair: **Alexander Gaos** Chair: **Alessandro Ponzo** Chair: **Erin Seney** Chair: **Brian Michael Shamblin**	

4:45pm - 5:00pm	**Session 4: Question & Answer** Location: **DAWE Plenary Room**
5:00pm - 6:00pm	**Meet the Poster Author(s) Session 1** Location: **Poster Rooms (1 - 4)**
6:00pm - 7:00pm	**Session 5: Anatomy, Physiology and Health #1** Location: **DAWE Plenary Room** Chair: **Kimberly Finlayson** Chair: **Maximilian Polyak** Chair: **Roldan Valverde** Chair: **Erina J Young**
7:00pm - 7:15pm	**Session 5: Question & Answer** Location: **DAWE Plenary Room**
7:15pm - 7:30pm	**BREAK**
7:30pm - 8:30pm	**Session 6: Fisheries and Threats #2** Location: **DAWE Plenary Room** Chair: **Matthew Godfrey** Chair: **Peter Bradley Richardson**
8:30pm - 8:45pm	**Session 6: Question & Answer** Location: **DAWE Plenary Room**
8:45pm - 9:00pm	**BREAK**
9:00pm - 10:00pm	**Session 7: Education, Outreach and Advocacy / Social, Economic and Cultural Studies #1** Location: **DAWE Plenary Room** Chair: **Andrea Phillott** Chair: **Hector Alonso Barrios-Garrido** Chair: **Seh Ling Long** Chair: **Zoe A. Meletis**
10:00pm - 10:15pm	**Session 7: Question & Answer** Location: **DAWE Plenary Room**

Date: Sunday, 27/Mar/2022

	Poster Presentations 1 (Population Biology / Education, Outreach & Advocacy) Location: **Poster Room 1**	**Poster Presentations 2 (Anatomy, Physiology & Health / In-water Biology)** Location: **Poster Room 2**
	Poster Presentations 3 (Fisheries & Threats / Conservation, Management & Policy) Location: **Poster Room 3**	**Poster Presentations 4 (Nesting Biology / Social, Economic & Cultural)** Location: **Poster Room 4**
4:00am - 5:00am	**Session 8: Nesting Biology (Ecology, Behaviour and Reproductive Success) #2** Location: **DAWE Plenary Room** Chair: **Michael Paul Jensen** Chair: **Jérôme Bourjea** Chair: **Mayeul Dalleau** Chair: **Kelly Stewart**	
5:00am - 5:15am	**Session 8: Question & Answer** Location: **DAWE Plenary Room**	
5:15am - 5:30am	**BREAK**	
5:30am - 6:30am	**Session 9: Population Biology and Monitoring (Status, Modelling, Demography, Genetics, Nesting Trends, and In-water Trends) #2** Location: **DAWE Plenary Room** Chair: **Alexander Gaos** Chair: **Alessandro Ponzo** Chair: **Erin Seney** Chair: **Brian Michael Shamblin**	
6:30am - 6:45am	**Session 9: Question & Answer** Location: **DAWE Plenary Room**	
6:45am - 7:00am	**BREAK**	
7:00am - 8:00am	**Session 10: Anatomy, Physiology and Health #2** Location: **DAWE Plenary Room** Chair: **Kimberly Finlayson** Chair: **Maximilian Polyak** Chair: **Roldan Valverde** Chair: **Erina J Young**	
8:00am - 8:15am	**Session 10: Question & Answer** Location: **DAWE Plenary Room**	
8:15am - 9:15am	**Meet the Poster Author(s) Session 2** Location: **Poster Rooms (1 - 4)**	
9:15am - 10:15am	**Session 11: In-water Biology (Behaviour, Ecology, Migration, Telemetry, and Foraging) #2 (Sponsored by AIMS)** Location: **DAWE Plenary Room** Chair: **Anton D Tucker** Chair: **Ana Rita Patrício** Chair: **Alan Rees** Chair: **George Shillinger** Chair: **Jeanette Wyneken** Sponsored by: Australian Institute of Marine Science (AIMS)	
10:15am - 10:30am	**Session 11: Question & Answer** Location: **DAWE Plenary Room**	
10:30am - 11:30am	**Student Mixer + Speed Chatting with the Experts #1** Location: **ConocoPhillips Lounge**	
11:30am - 12:30pm	**Session 12: In-water Biology (Behaviour, Ecology, Migration, Telemetry, and Foraging) #3 (Sponsored by AIMS)** Location: **DAWE Plenary Room** Chair: **Anton D Tucker** Chair: **Ana Rita Patrício** Chair: **Alan Rees**	

	Chair: **George Shillinger** Chair: **Jeanette Wyneken** Sponsored by: Australian Institute of Marine Science
12:30pm - 12:45pm	**Session 12: Question & Answer** Location: **DAWE Plenary Room**
12:45pm - 1:00pm	**BREAK**
1:00pm - 2:00pm	**Session 13: Conservation, Management and Policy #1** Location: **DAWE Plenary Room** Chair: **Nancy FitzSimmons** Chair: **Tyffen Read** Chair: **Mariana Fuentes** Chair: **Simona A Ceriani**
2:00pm - 2:15pm	**Session 13: Question & Answer** Location: **DAWE Plenary Room**
2:15pm - 2:30pm	**BREAK**
2:30pm - 3:30pm	**Session 14: Population Biology and Monitoring (Status, Modelling, Demography, Genetics, Nesting Trends, and In-water Trends) #3** Location: **DAWE Plenary Room** Chair: **Alexander Gaos** Chair: **Alessandro Ponzo** Chair: **Erin Seney** Chair: **Brian Michael Shamblin**
3:30pm - 3:45pm	**Session 14: Question & Answer** Location: **DAWE Plenary Room**
3:45pm - 4:45pm	**Meet the Poster Author(s) Session 3** Location: **Poster Rooms (1 - 4)**
4:45pm - 5:45pm	**Session 15: In-water Biology (Behaviour, Ecology, Migration, Telemetry, and Foraging) #4 (Sponsored by AIMS)** Location: **DAWE Plenary Room** Chair: **Anton D Tucker** Chair: **Ana Rita Patrício** Chair: **Alan Rees** Chair: **George Shillinger** Chair: **Jeanette Wyneken** Sponsored by: Australian Institute of Marine Science
5:45pm - 6:00pm	**Session 15: Question & Answer** Location: **DAWE Plenary Room**
6:00pm - 6:15pm	**BREAK**
6:15pm - 7:15pm	**Session 16: Conservation, Management and Policy #2** Location: **DAWE Plenary Room** Chair: **Nancy FitzSimmons** Chair: **Tyffen Read** Chair: **Mariana Fuentes** Chair: **Simona A Ceriani**
7:15pm - 7:30pm	**Session 16: Question & Answer** Location: **DAWE Plenary Room**
7:30pm - 7:45pm	**BREAK**
7:45pm - 8:45pm	**Session 17: Nesting Biology (Ecology, Behaviour and Reproductive Success) #3** Location: **DAWE Plenary Room** Chair: **Michael Paul Jensen** Chair: **Jérôme Bourjea**

	Chair: **Mayeul Dalleau** Chair: **Kelly Stewart**
8:45pm - 9:00pm	**Session 17: Question & Answer** Location: **DAWE Plenary Room**
9:00pm - 10:00pm	**Speed Chatting with the Experts #2** Location: **ConocoPhillips Lounge**

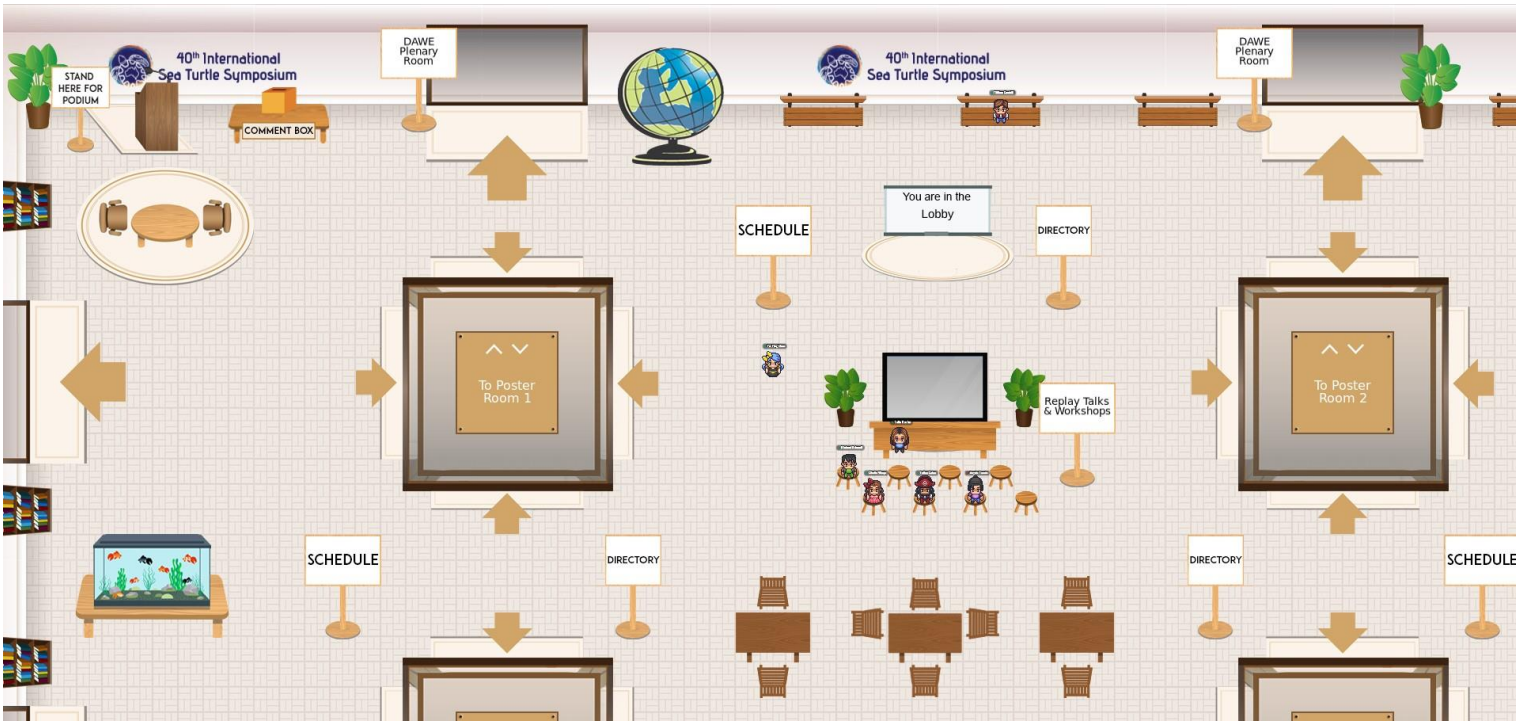
Date: Monday, 28/Mar/2022

	Poster Presentations 1 (Population Biology / Education, Outreach & Advocacy) Location: **Poster Room 1**	**Poster Presentations 2 (Anatomy, Physiology & Health / In-water Biology)** Location: **Poster Room 2**
	Poster Presentations 3 (Fisheries & Threats / Conservation, Management & Policy) Location: **Poster Room 3**	**Poster Presentations 4 (Nesting Biology / Social, Economic & Cultural)** Location: **Poster Room 4**
2:00am - 3:00am	**Session 18: Population Biology and Monitoring (Status, Modelling, Demography, Genetics, Nesting Trends, and In-water Trends) #4** Location: **DAWE Plenary Room** Chair: **Alexander Gaos** Chair: **Alessandro Ponzo** Chair: **Erin Seney** Chair: **Brian Michael Shamblin**	
3:00am - 3:15am	**Session 18: Question & Answer** Location: **DAWE Plenary Room**	
3:15am - 3:30am	**BREAK**	
3:30am - 4:30am	**Session 19: In-water Biology (Behaviour, Ecology, Migration, Telemetry, and Foraging) #5 (Sponsored by AIMS)** Location: **DAWE Plenary Room** Chair: **Anton D Tucker** Chair: **Ana Rita Patrício** Chair: **Alan Rees** Chair: **George Shillinger** Chair: **Jeanette Wyneken** Sponsored by: Australian Institute of Marine Science	
4:30am - 4:45am	**Session 19: Question & Answer** Location: **DAWE Plenary Room**	
4:45am - 5:00am	**BREAK**	
5:00am - 6:00am	**Session 20: Anatomy, Physiology and Health #3** Location: **DAWE Plenary Room** Chair: **Kimberly Finlayson** Chair: **Maximilian Polyak** Chair: **Roldan Valverde** Chair: **Erina J Young**	
6:00am - 6:15am	**Session 20: Question & Answer** Location: **DAWE Plenary Room**	
6:15am - 7:00am	**BREAK**	
7:00am - 8:00am	**Session 21: Population Biology and Monitoring (Status, Modelling, Demography, Genetics, Nesting Trends, and In-water Trends) #5** Location: **DAWE Plenary Room** Chair: **Alexander Gaos** Chair: **Alessandro Ponzo** Chair: **Erin Seney** Chair: **Brian Michael Shamblin**	
8:00am - 8:15am	**Session 21: Question & Answer** Location: **DAWE Plenary Room**	
8:15am - 8:30am	**BREAK**	
8:30am - 9:30am	**Session 22: In-water Biology (Behaviour, Ecology, Migration, Telemetry, and Foraging) #6 (Sponsored by AIMS)** Location: **DAWE Plenary Room** Chair: **Anton D Tucker** Chair: **Ana Rita Patrício**	

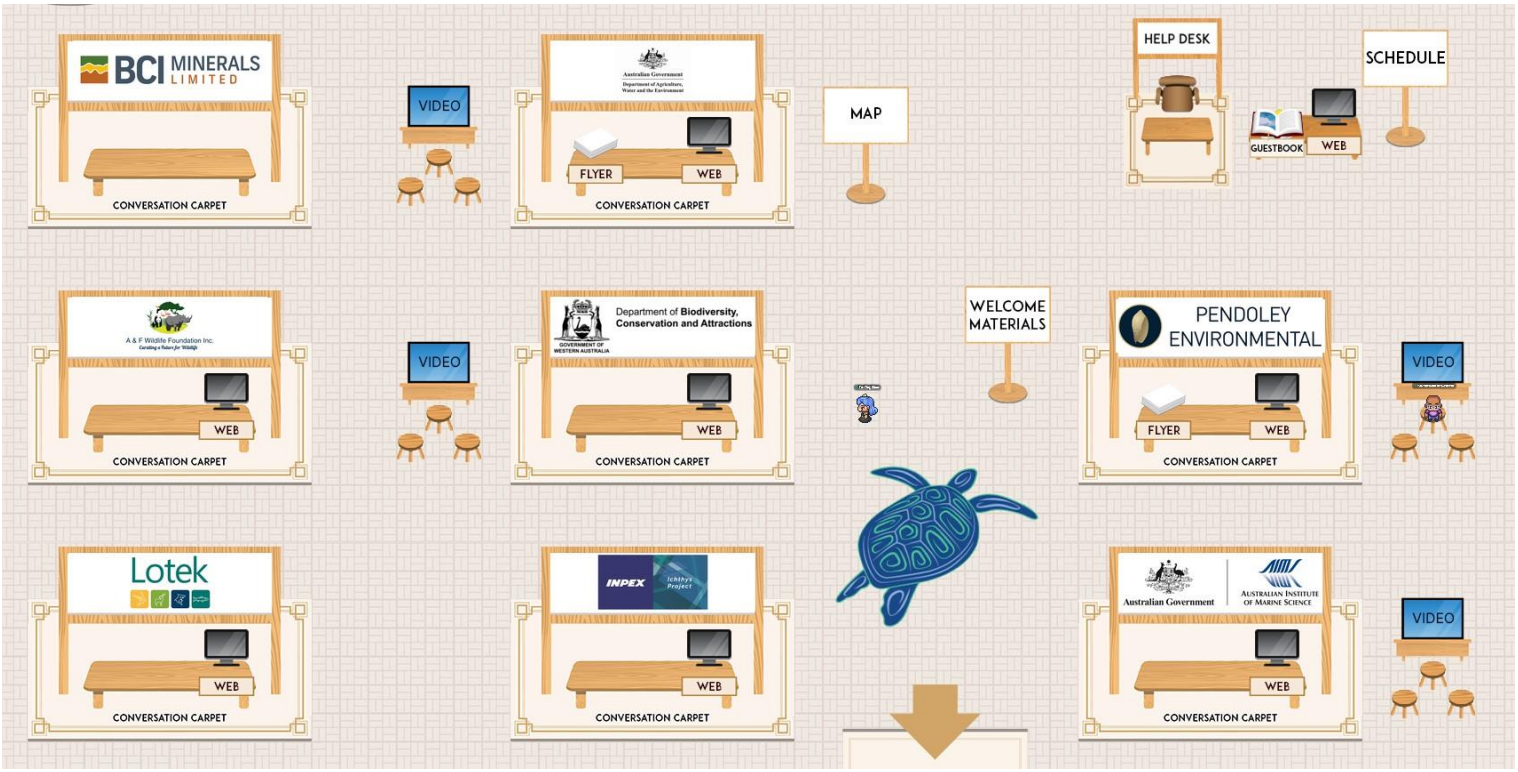
	Chair: **Alan Rees** Chair: **George Shillinger** Chair: **Jeanette Wyneken** Sponsored by: Australian Institute of Marine Science
9:30am - 9:45am	**Session 22: Question & Answer** Location: **DAWE Plenary Room**
9:45am - 11:45am	**BREAK**
11:45am - 12:45pm	**Awards + Nomination Outcomes** Location: **DAWE Plenary Room**
12:45pm - 1:30pm	**Closing Remarks** Location: **DAWE Plenary Room**

附錄二、與會空間截圖

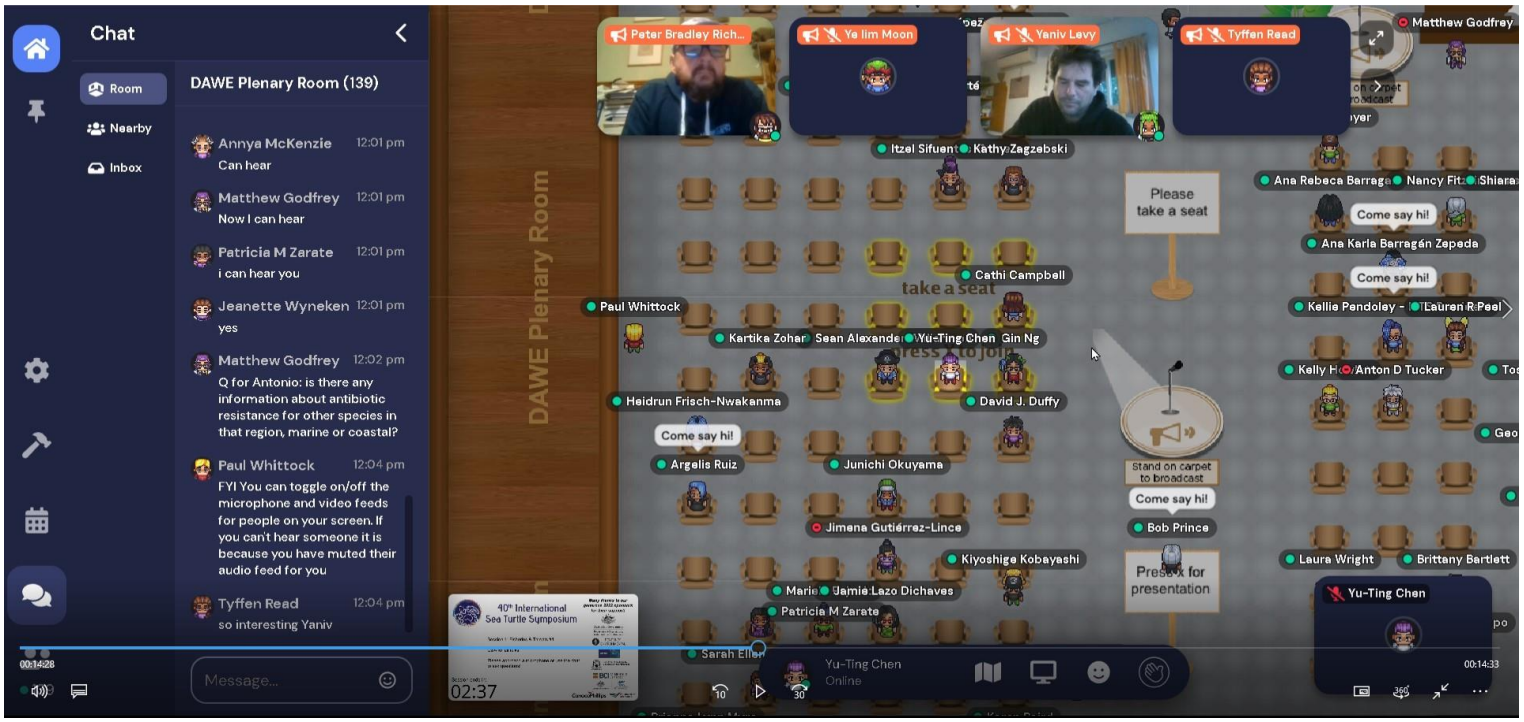
大廳（Lobby）



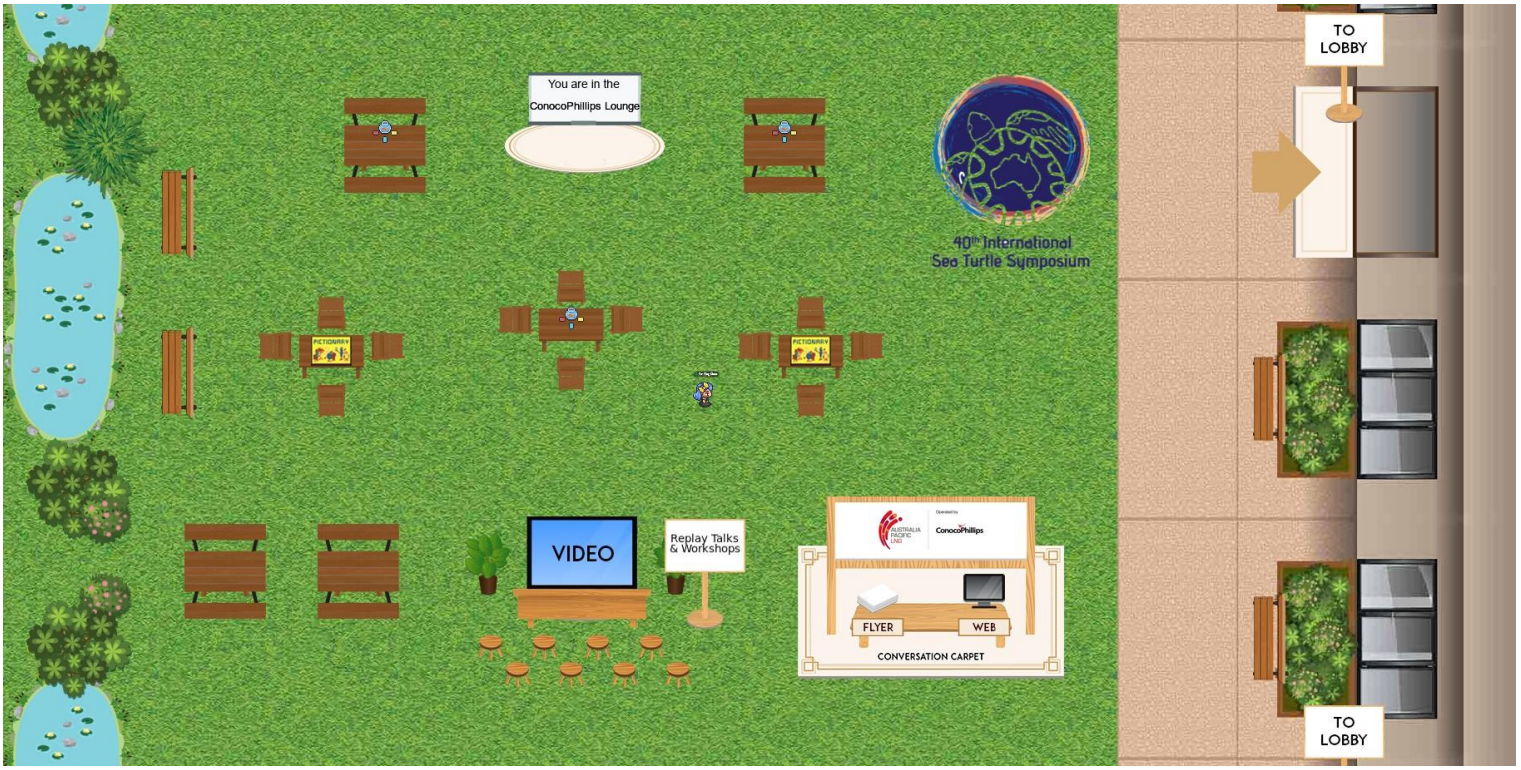
贊助商及供應商攤位（Sponsors & Vendors）



DAWE 全體會議室（DAWE Plenary Room）



室外休息區



附錄三、ISTS40整體執行計畫

40th International Sea Turtle Symposium

PERTH, AUSTRALIA (ONLINE)

www.ists40perth.com.au

ISTS40 PROGRAM

25th – 28th March 2022

Version D 25/03/2022

Dear ISTS Attendees,

In the three years since the 39th Symposium in Charleston, the world as we know it has changed irrevocably. The battle to overcome COVID has touched every person on Earth, while the political instability and war in Ukraine remind us how fragile peace is. The decision by the Board in 2020 to cancel the Cartagena Symposium was a difficult one to make, and in the uncertain times that followed, it was evident from the global progress of COVID that we could not plan for a face-to-face Symposium with any certainty. In that space, the idea of the first online International Sea Turtle Symposium was born.

Switching from planning and organising a face-to-face Symposium to a virtual online Symposium has been a huge learning curve. None of the organising committee had ever done anything like this before and realised early on it was not as simple as scheduling a few Zoom calls. We also saw this as a good opportunity to update and integrate the Society web pages with a new membership and Symposium software to help streamline the process going forward. While there have been a few teething problems it has substantially improved the administration of the Society and made the Treasurer and bookkeepers' jobs much easier!

Clearly, an online event could not replicate all the social events of typical Symposium, however we were able to accommodate the regional meetings (7) and workshops (11), and posters (128) and orals (109) in session themes that include: Fisheries and Threats; Nesting Biology; In-water Biology; Population Biology and Monitoring; Anatomy, Physiology and Health; Education, Outreach and Advocacy/Social, Economic and Cultural; Conservation Management and Policy. The sessions have been scheduled across as many time zones as possible to accommodate the registered delegates from 75 countries.

The Symposium will be opened by a Welcome to Country performed by Wadjuk Noongar man, Nick Abrahams, Traditional Custodian of the land upon which we will host the Symposium. I would also like to take this opportunity to acknowledge the Traditional Custodians of the lands of all Symposium attendees and welcome them to this event.

Keynote speakers will follow my opening address and will speak on the theme of 'Balance'; recognising that industrial development is inevitable in existing and emerging economies and the need to work to minimise our human impact and tread lightly on the earth. The keynote speakers will address the environmental management and regulation of industry in Western Australia and how the approach taken here has led to excellent research and conservation outcomes for marine turtles Australia-wide.

They are Abigail Ross (Fortescue Future Industries), Scott Whiting (WA Department of Biodiversity, Conservation and Attractions), and Albert Wiggan (Indigenous Leader, Bardi, Nyul Nyul, Kia man).

Normally at these Symposiums we would socialise and catch up with old friends and make new ones, face-to-face in some exotic location. Instead, we will make use of technology to make those connections *via* the GatherTown online platform using personal avatars, chatting in virtual spaces through online video links. A new space and new technology for the new world we live in. We are particularly excited to be able to welcome those attendees who might not ordinarily have had the chance or financial resources to attend a Symposium but can do so now *via* the internet.

On behalf of the organising committee and everyone who has answered our calls and responded to our emails and stepped up to try, if not wholly understand or embrace this virtual approach, I want to say thank you for supporting and trusting us to deliver this event to you.

Cheers

Kellie Pendoley

Kellie L Pendoley, PhD
President, International Sea Turtle Society

40th INTERNATIONAL SEA TURTLE SYMPOSIUM COMMITTEE CHAIRS AND KEY ORGANISERS

President	Kellie Pendoley
Past President	Kenneth J. Lohmann
President-Elect	Diego Amorocho
Secretary	Manjula Tiwari
Treasurer	Nicholas Blume
Bookkeeper	Terry Meyer
Program Chair	Nancy FitzSimmons
Program Committee	Nancy FitzSimmons, Kellie Pendoley, Paul Whittock
Registrar	Paul Whittock
Webmaster	Paul Whittock, Adam Mitchell
Virtual Space Designer	Rhonda Clark, Paul Whittock
Nominations Committee	Mustapha Aksissou (Chair), Ryan Welsh, Gabriela Velez-Rubio, Nicholas Pilcher, Roldán Valverde
Exhibitor/Vendor Chair	Paul Whittock
Workshops Committee	Kellie Pendoley, Daniela Freggi, Sandra Hochscheid
ISTS Career Awards Committee	Hector Barrios Garrido, Ana Liria Loza, Mariluz Parga, Frank Paladino, Michael Salmon
Grassroots Conservation Award Committee	Ingrid Yañez
Student Awards Committee	Andrea Phillott, Matthew Godfrey
Speed Chatting with the Experts	Alexandra Fireman, Gabi Arango, Matthew Ramirez, Renato Saragoça Bruno
Student Committee	Alexandra Fireman, Gabi Arango, Matthew Ramirez, Renato Saragoça Bruno
Proceedings Coordinators	Lisa Belskis
Proceedings Compilers	Anton D Tucker, Paul Whittock
Program	Paul Whittock
Regional Meeting/Reunion	**Africa:** Manjula Tiwari, Angela Formia, Andrews Aguekumhene **Indian Ocean & Southeast Asia (IOSEA):** Lalith Ekanayake, Zahirul Islam **RETOMALA:** Daniela Rojas, Jaime Restrepo, Daniel Gonzalez-Paredes, Carmen Mejías Balsalobre, Jimena Gutiérrez **Mediterranean:** Sandra Hochscheid, Yakup Kaska, Aliki Panagopoulou **Oceania/Pacific:** Irene Kelly **East Asia:** Connie Ka Yan Ng **WIDECAST:** Karen Eckert, Kate Charles
Social Media Support	Paul Whittock, Andrea Phillott, Lauren Peel
Workshop Organisers	See program (ISTS Workshops starting on p. 20)
Session Chairs	See program (Chairs listed for each oral session block)

ISTS40 AT A GLANCE (UTC +8 TIME ZONE)

Friday 25th March	Saturday 26th March	Sunday 27th March	Monday 28th March
RETOMALA Regional Meeting 1am - 4am Meeting Room 2	**Poster Presentations** From 8am onwards Poster Rooms 1 - 4	**Poster Presentations** All day Poster Rooms 1 - 4	**Poster Presentations** All day Poster Rooms 1 - 4
Workshop 1: Quantifying Cumulative Stressors to Sea Turtles 1am - 5am Meeting Room 4	**Opening Remarks / Welcome to Country / Keynote Talks** 8am - 10:30am Plenary Room	**Session 8: Nesting Biology** 4am - 5:15am Plenary Room	**Session 18: Population Biology & Monitoring** 2am - 3:15am Plenary Room
Workshop 2: Combatting Global Marine Tortoiseshell Trade 5am - 9am Meeting Room 2	**Session 1: Fisheries & Threats** 11am - 12:15pm Plenary Room	**Session 9: Population Biology & Monitoring** 5:30am - 6:45am Plenary Room	**Session 19: In-water Biology** 3:30am - 4:45am Plenary Room
Workshop 3: SSAP for Loggerhead Turtles in South Pacific 5am - 9am Meeting Room 3	**Session 2: Nesting Biology** 12:30pm - 1:45pm Plenary Room	**Session 10: Anatomy, Physiology & Health** 7am - 8:15am Plenary Room	**Session 20: Anatomy, Physiology & Health** 5am - 6:15am Plenary Room
Oceania Regional Meeting 7am - 10am Meeting Room 5	**Session 3: In-water Biology** 2:15pm - 3:30pm Plenary Room	**Meet the Poster Author(s) Session 2** 8:15am - 9:15am Poster Rooms 1 - 4	**Session 21: Population Biology & Monitoring** 7am - 8:15am Plenary Room
Workshop 4: Conservation Status of IOSEA Hawksbills 8am - 12pm Meeting Room 1	**Session 4: Population Biology & Monitoring** 3:45pm - 5pm Plenary Room	**Session 11: In-water Biology** 9:15am - 10:30am Plenary Room	**Session 22: In-water Biology** 8:30am - 9:45am Plenary Room
Workshop 5: Light Pollution Solutions for Sea Turtles 8am - 12pm Meeting Room 4	**Meet the Poster Author(s) Session 1** 5pm - 6pm Poster Rooms 1 - 4	**Student Mixer + Speed Chatting with the Experts #1** 10:30am - 11:30am ConocoPhillips Lounge	**Awards + Nomination Outcomes** 11:45am - 12:45pm Plenary Room
Workshop 6: Bridging the Gaps: Asia-Pacific Genetic Working Group 11am - 3pm Meeting Room 2	**Session 5: Anatomy, Physiology & Health** 6pm - 7:15pm Plenary Room	**Session 12: In-water Biology** 11:30am - 12:45pm Plenary Room	**Closing Remarks** 12:45pm - 1:30pm Plenary Room
East Asia Regional Meeting 12pm - 3pm Meeting Room 5	**Session 6: Fisheries & Threats** 7:30pm - 8:45pm Plenary Room	**Session 13: Conservation, Management & Policy** 1pm - 2:15pm Plenary Room	
Workshop 7: Sea Turtle Movement and Ocean Surface Current 1pm - 5pm Meeting Room 3	**Session 7: Education, Outreach & Advocacy / Social, Economic & Cultural** 9pm - 10:15pm Plenary Room	**Session 14: Population Biology & Monitoring** 2:30pm - 3:45pm Plenary Room	
Mediterranean Regional Meeting 3pm - 6pm Meeting Room 1		**Meet the Poster Author(s) Session 3** 3:45pm - 4:45pm Poster Rooms 1 - 4	
IOSEA Regional Meeting 3pm - 6pm Meeting Room 5		**Session 15: In-water Biology** 4:45pm - 6pm Plenary Room	
Africa Regional Meeting 4pm - 7pm Meeting Room 2		**Session 16: Conservation, Management & Policy** 6:15pm - 7:30pm Plenary Room	
Workshop 8: Sea Turtle Medicine, Rehabilitation and Rescue 4pm - 8pm Meeting Room 4		**Session 17: Nesting Biology** 7:45pm - 9pm Plenary Room	
Workshop 9: Conservation of Sea Turtles along the Atlantic and Mediterranean coasts of Africa 7pm - 12am Meeting Room 1		**Speed Chatting with the Experts #2** 9pm - 10pm ConocoPhillips Lounge	
Workshop 11: How to Succeed in the Turtle World and Beyond 8pm - 12am Meeting Room 2			
Workshop 10: ICAPO: Eastern Pacific Hawksbill Research and Conservation: Current Status 10pm - 4am Meeting Room 3			
WIDECAST (Caribbean) Regional Meeting 11pm - 2am Meeting Room 5			

SYMPOSIUM INFORMATION

Time Zones

All times shown in this Program are based on the UTC+8 or AWST time zone. To view the time of scheduled events in your local time zone, please login to the registration site and select 'Browse Conference Agenda'. A summary of scheduled events for each time zone can be downloaded via our website here: www.ists40perth.com.au/program/ists40-at-a-glance.

Daylight Savings

Daylight saving, whereby the clocks move forward one-hour, will occur for most European countries during the 40th International Sea Turtle Symposium (ISTS40) on 27th March (Israel/Syria on 25th March). This means if you are based in Europe, you will shift forward into the next UTC time zone. For those using the local time via the conference agenda, the time shown for those events scheduled after daylight saving comes into effect is not correct because the agenda uses your current local time zone. Once daylight saving comes into effect and you shift forward into the next time zone, the local times in the agenda will update to the correct time.

We understand that this may be confusing, so we have added a countdown timer to the start time of each event on our website here: www.ists40perth.com.au/program/schedule-of-events. Furthermore, a notice for when effected UTC time zones experience daylight saving can be seen on our summary of events page here: www.ists40perth.com.au/program/ists40-at-a-glance.

On-Demand Viewing

The opening/closing remarks, keynote talks, oral presentation videos, and awards/nomination outcomes will be recorded and made available to watch on-demand *via* video players within the virtual space. The on-demand content will be available to watch until access to the space ends on 8th April 2022. Some workshops will also be recorded and made available to watch on-demand (at the discretion of the workshop organisers). Note that it can take up to 24 hours for recorded footage to be uploaded and appear within the space.

Poster Presentations and 'Meet the Poster Author(s)' Sessions

Posters will be displayed across four Poster Rooms. There will be three 'Meet the Poster Author(s)' sessions held throughout ISTS40:

- **Session 1:** 5:00 – 6:00 pm Saturday 26th March 2022
- **Session 2:** 8:15 – 9:15 am Sunday 27th March 2022
- **Session 3:** 3:45 – 4:45 pm Sunday 27th March 2022

During these times, presenting authors are encouraged to stand within the conversation carpet surrounding their poster to interact with interested participants to answer questions. Please note that students who want to be considered for an Archie Carr Student Award must be present at their posters during at least one of these poster sessions.

Speed Chatting with the Experts

This is a free function organised by the Student Committee that provides a way for symposium newcomers and veterans alike to spend time chatting with an all-star gathering of sea turtle aficionados and experts. It is intended to be an "ice-breaker" for getting to know people you've always wanted to meet but have never approached. To accommodate different time-zones, there are two speed chatting sessions taking place in the **ConocoPhillips Lounge**:

- **Speed Chatting with the Experts #1: (coincides with the Student Mixer):** 10:30 to 11:30 am on Sunday 27th March.
- **Speed Chatting with the Experts #2:** 9:00 – 10:00 pm on Sunday 27th March

To sign up for a speed chatting slot, please open the 'Sign Up Here' interactive sign in the ConocoPhillips Lounge. You can sign up to speak with up to five experts and can add yourself to a waitlist to talk to more experts.

Student Mixer

The Student Committee has organised a Student/Social Mixer event in the ConocoPhillips Lounge at 10:30 – 11:30 am on Sunday 27th March. This is an opportunity for students, researchers, professionals to socialize in an informal setting.

ISTS40 T-Shirts

Recognising the online nature of ISTS40, we have teamed up with a global distributor to enable participants to purchase a shirt from anywhere in the world. All profit from the sale of shirts goes directly towards the International Sea Turtle Society. You can purchase your t-shirt here: www.bonfire.com/40th-international-sea-turtle-symposium. Unfortunately, the distributor has suspended its service to some countries, including Australia.

Our Logo

The ISTS40 logo was designed by Aboriginal artist and graphic designer Jilalga Murray who is a Nyangumarta & Yorta Yorta woman based in Perth, Western Australia.

THE ISTS40 VIRTUAL SPACE

Access

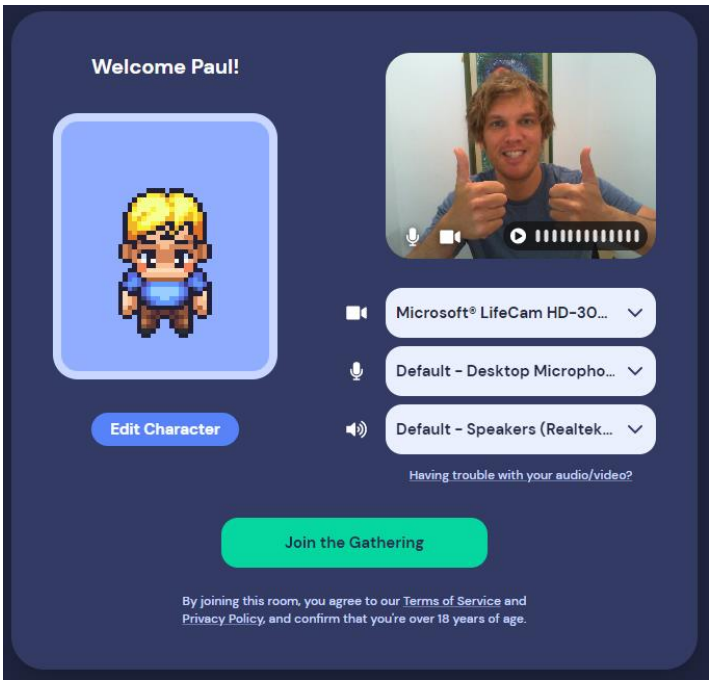
The link to access the virtual space is located on our landing page: www.virtualchair.net/events/ists40. Please note that the virtual space is best accessed using a Google Chrome or Firefox internet browser (please ensure this is the most current version).

When accessing, you will be asked to enter the primary email address you used during registration for authentication. If you are unsure what email address this is, please view your user profile on the ISTS40 registration site (www.conftool.pro/ists40). After entering your email address, you will receive a one-time use 6-digit authentication code in your email which you need to type in to enter the space. Please check your spam, junk, or clutter folder if you do not receive this email. Alternatively, if you have a Gmail or Google account, select "Sign in with Google" and there will be nothing else to do.

When accessing the virtual space for the first time, you will also be asked to allow Gather access to your microphone and web camera.

Avatar/Character

When accessing the space, you will be prompted to create your avatar/character from the options available. You will use this avatar/character to navigate the space and interact with others. Your name and affiliation will be set according to your registration profile and you do not have the option to edit it.



Troubleshooting

In advance of ISTS40, we strongly encourage you to test your access to the virtual space from the computer and internet connection that you will be using during the symposium. You will have access to the virtual space from 12:00 pm on the 21st March 2022.

If you are likely to use a VPN, company or university network, or encounter regional firewalls that control which sites can access features like a web camera, microphone, auto-play, display embedded links etc, it may be necessary to request your network provider to whitelist the following domains:

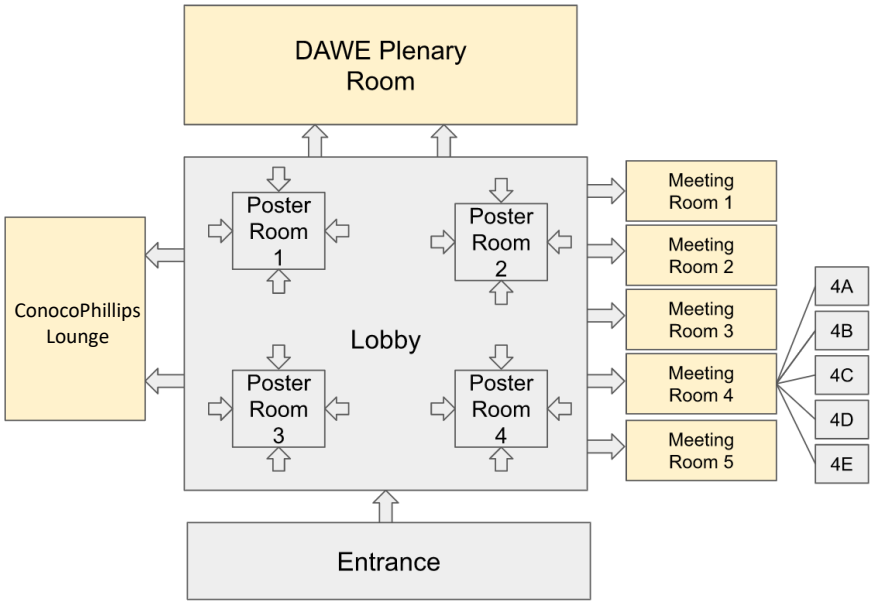
- https://gather.town
- https://virtualchair.gather.town
- https://widget1.virtualchair.net
- https://stream.mux.com/

If the security settings of your computer or internet network are not able to be adjusted and you encounter an issue while practicing in the venue, please consider connecting from a different location or network during ISTS40.

Layout

The layout of the virtual space is very similar to a typical conference space and consists of an Entrance, Lobby, Lounge (sponsored by ConocoPhillips), Poster Rooms (1 – 4), Meeting Rooms (1 – 5), and a Plenary Room (sponsored by the Australia Government Department of Agriculture, Water and the Environment; DAWE).

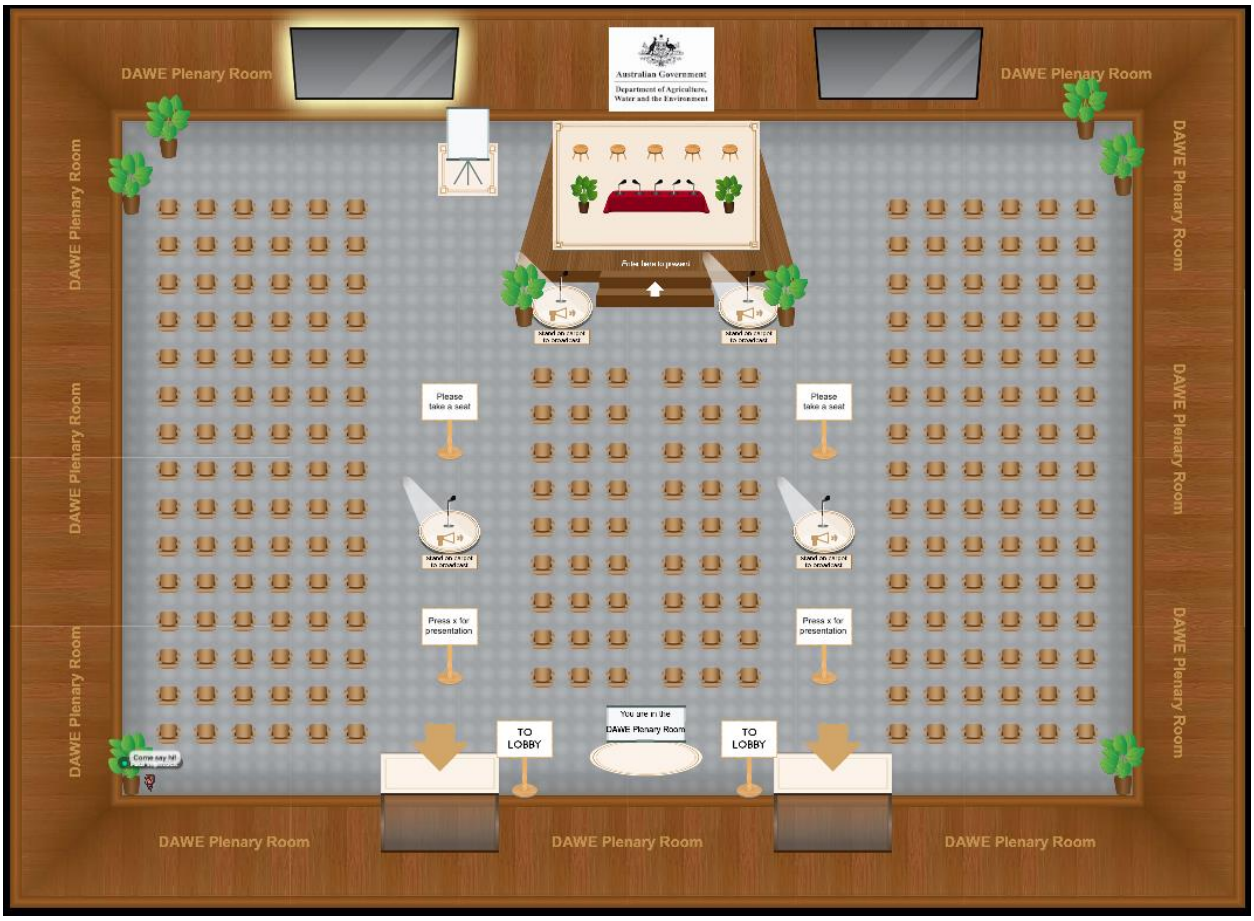
When you first enter the virtual space, your character/avatar will appear within the Entrance space. This space features helpful tips on navigating the virtual environment, a map of the entire space, and instructional videos.



DAWE Plenary Room

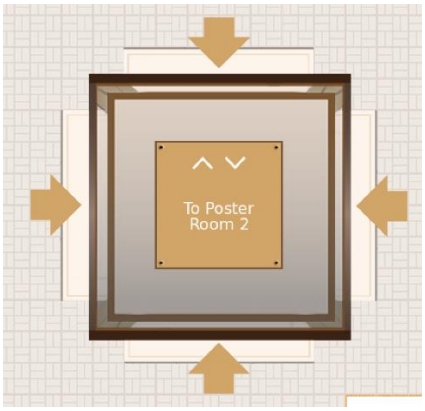
This room will host the opening/closing remarks, keynote talks, oral presentation sessions (including Q&A), and the awards/nomination outcomes. After entering the room and moving to a chair, you will need to press '**X**' on your keyboard to view the presentation (an on-screen prompt will also appear).

During the Q&A sessions, presenting authors will use the stage at the front of the room to answer questions from the session chairs. Note that by standing on the stage, your video and audio will be broadcast to everyone in the room.

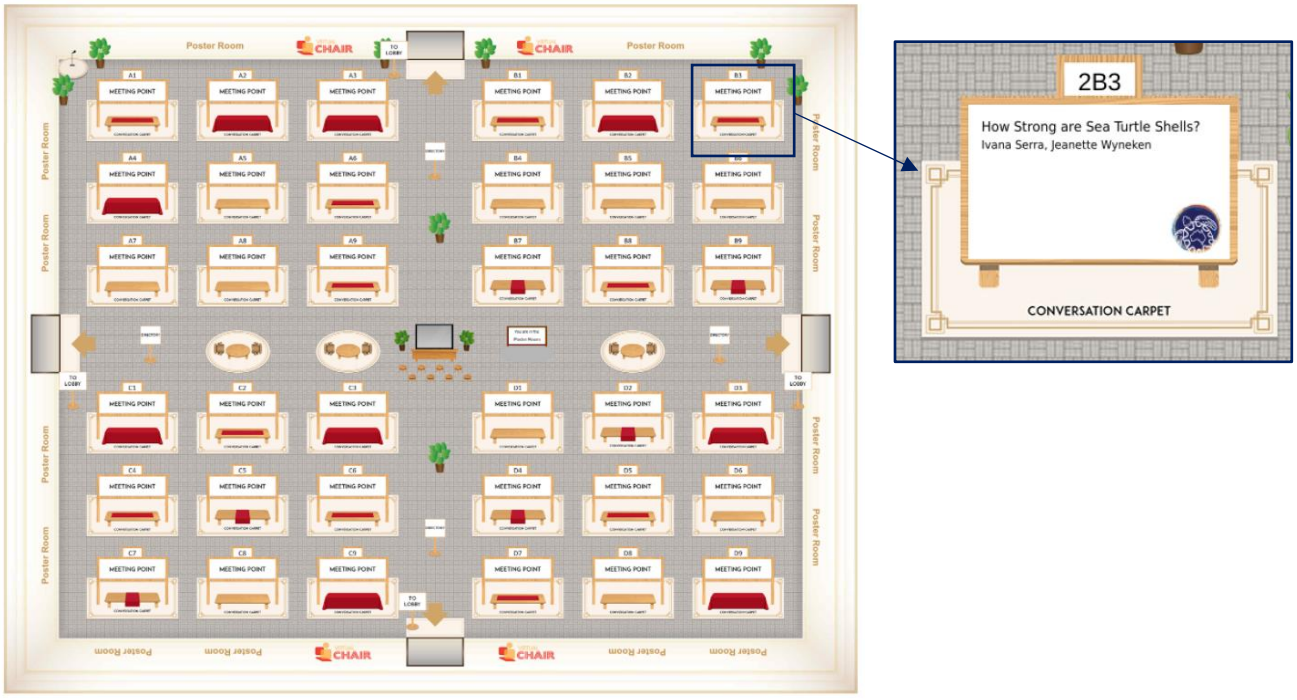


Poster Room

There are four poster rooms within the virtual space, and these are accessed *via* the lobby. When you move into the space (*via* the brown arrows) you will be transported to a larger poster room.



Each poster room contains up to 36 posters split across four zones (A – D). To find a particular poster, use the three-digit ID code of the poster that features in the program. The first digit corresponds to the poster room number, the second digit corresponds to the zone within the room (A – D), and the third corresponds to the location of the poster within the zone. For example, a poster with ID '1.A3' would be in Poster Room 1, Zone A, and the third poster in the zone.



Each poster features the submission title and listed authors. To interact and view the poster, move your character/avatar to within the conversation carpet space and press '**X**' to view the poster (prompts will also appear on-screen). You can then use the on-screen controls to zoom in, view, and pan across the poster, much like navigating a standard PDF document.

Meeting Room

Workshops and Regional Meetings will be held within one of five Meeting Rooms available within the virtual space. Each Meeting Room features an interactive area where participants can enter a Zoom meeting/webinar (as indicated by the red dashed box below). There are also three breakout areas, each featuring an interactive whiteboard.

Unless registered, please avoid these rooms on the Friday 25th March when there are Regional Meetings and Workshops being held.

Lobby

The lobby is the main hub of ISTS40 and features the following:

- Help desk: This desk will be manned by the virtual space designers who will be able to assist and troubleshoot any issues.
- Guestbook: Feel free to say hello from wherever you are participating from.
- Comment box: We welcome all feedback!
- Interactive World Globe: You can add a pin from your location so that we can see where all the participants are located.
- Private conversation spaces: Utilise these to have a private huddle with a group of collaborators, friends, or colleagues.
- Vendor booths (x 4)
- Sponsor booths (x 6)

ConocoPhillips Lounge

The lounge is a great place to head to between sessions and during breaks, it will also be the venue for the Student Mixer and Speed Chatting with the Experts (held in Tables 1 – 9) events. The lounge also features interactive multi-player games such as Sudoku and Pictionary.

VENDORS

The following vendors will host a booth in the lobby of the virtual space. Each booth features a conversation carpet that enables private interaction with the vendor host (if present), and interactive content such as links to a website, flyer, or a promotional video.

Lotek is a world leader in the design and manufacture of wildlife monitoring systems. Their innovative and internationally recognized satellite, acoustic, archival and radio monitoring solutions allow researchers to track animals of almost any size in most environments.

CLS, a subsidiary of CNES and CNP, is a worldwide company and pioneer provider of monitoring and surveillance solutions for Earth since 1986. The company is exclusive provider of Argos environmental data.

Care For Hedland's community-based turtle monitoring program was established in 2004 to provide a much-needed role for the awareness and conservation of the local threatened flatback sea turtle species, *Natator depressus*. The presence of flatback turtles in Hedland gives a unique opportunity for the community and visitors to the area to be actively involved in contributing to the monitoring of the protected species. In 2010, Care For Hedland won the WA Environment Award Biodiversity Conservation for our Flatback Turtle Monitoring Program.

At A & F Wildlife Foundation Inc, our commitment is to providing funding for young Wildlife Professionals and Enthusiasts to take positive actions to conserve, preserve and protect Wildlife Species as well as work with the communities where they are found.

SPONSORS

Each Gold and Silver sponsor will host a booth in the lobby of the virtual space. Each booth features a conversation carpet that enables private interaction with the sponsor host (if present), and interactive content such as links to a website, flyer, or a promotional video.

Gold Sponsor

Australian Government Department of Agriculture, Water and the Environment (DAWE)

Silver Sponsors

PENDOLEY ENVIRONMENTAL

Pendoley Environmental (www.penv.com.au) was established in 1997 by Dr Kellie Pendoley. From humble beginnings we've grown into a leading marine conservation biology and artificial light assessment consultancy, with specialists operating out of our Perth office working on coastal and offshore projects across Australia and beyond.

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

Australian Government

AUSTRALIAN INSTITUTE OF MARINE SCIENCE

Silver Sponsor

BCI MINERALS LIMITED

Lounge Sponsor

ConocoPhillips

ConocoPhillips Australia, as downstream operator of the Australia Pacific LNG facility in Gladstone, has been supporting the Quoin Island Turtle Rehabilitation Centre since 2014 and has invested over $500,000 into the treatment and rehabilitation of marine turtles. This support ensures sick and injured turtles are cared for until they can be released back into their natural environment.

Bronze Sponsors

PILBARA PORTS AUTHORITY

MINERAL RESOURCES

Student Award Sponsors

LOGGERHEAD MARINELIFE CENTER

المحيطات الخمسة لخدمات البيئة ش م م
Five Oceans Environmental Services LLC.

BURO HAPPOLD

KEYNOTE SPEAKERS

Abigail Ross – Principal Marine Environmental Advisor, Fortescue Future Industries

Abigail is the Principal Marine Environmental Advisor at Fortescue Future Industries and has been involved in the field of marine science for 17 years. She started her career as a volunteer for a Guatemala-based NGO involved in sea turtle conservation and has maintained her connection and love for sea turtles ever since. Her career shifted into professional consulting, gaining her a diverse range of experiences in delivering multi-disciplinary marine environmental projects for a variety of industries and extensive technical knowledge of the marine environment, specifically with sea turtles and other marine fauna.

Abigail joined Fortescue Future Industries (FFI) in 2021, a new global green energy and product company committed to producing zero-emission green hydrogen from 100% renewable sources. FFI is a founding member of the First Movers Coalition (formed at COP26) which involves 34 leading global companies, the World Economic Forum, and the US Special Presidential Envoy for Climate (John Kerry). The coalition aims to act on climate change and recognise the critical climate target of 1.5 °C can only be reached if we accelerate and scale the development of new decarbonising technologies. At FFI, Abigail provides strategic marine environmental advice to inform engineering and environmental approval components of each international development, including strategies, scheduling and management of environmental studies (to international best practice standards), and recommendation of appropriate management and mitigation measures for multiple greenfield and brownfield green energy projects globally.

Dr Scott Whiting – Principal Research Scientist and Coordinator of NWSFTCP, Department of Biodiversity, Conservation and Attractions (WA State Government)

Scott holds a PhD and has over 25 years of experience in marine and turtle research, prioritisation, planning, and delivery of large research programs. His work experience extends across university, non-government, state and territory governments, and private industry with projects across northern Australia and the Indian Ocean Territories.

Scott has been actively involved in sea turtle conservation through the development of the Recovery Plan for Marine Turtles in Australia, advice on impact assessments, as a member of the IUCN Specialist Group, as an independent expert on several large industrial developments, through Marine Park Planning processes, and as a delegate and as a member of the scientific committee to

IOSEA. He has an extensive publication record with over 50 peer-reviewed papers in specialist and cross-discipline journals with high profile co-authors.

Throughout his career in northern Australia, Scott has worked collaboratively with Indigenous groups to develop an improved and shared understanding of turtle biology and populations, and incorporate education and job pathways in community conservation.

Currently, Scott coordinates a large environmental offset provided to the Western Australia Government as part of an oil and gas approval. This 60-year funding creates opportunities to increase the scientific knowledge base, develop long-term plans and conservation strategies, and develop local and regional capacity. Scott will present on the opportunities and gaps of this program.

Albert Wiggan – Indigenous Leader, Environmental Consultant and Social-Emotional Wellbeing Officer

Albert Wiggan is an Indigenous Leader from the beautiful waters of Cygnet Bay on the Dampier Peninsula in the far north-west region of Australia called the Kimberley's. He is Bardi, Nyul Nyul and Kija man and a passionate spokesperson for Country, Culture and Indigenous science.

When a developer proposed to build the world's largest LNG plant at James Price Point in 2008, Albert led an environmental campaign, lobbied in the Supreme court, and fronted a blockade, until the developer withdrew.

In 2019 he was awarded by Australian Geographic as their 'Conservationist of the Year' for his long commitment to environmental and cultural advocacy, and dedication towards conservation of land and threatened species.

Albert has worked extensively in both marine and terrestrial research projects throughout the region, and more recently as a full-time Environmental Consultant for the Nyul Nyul Rangers. He is also the first Indigenous representative from Western Australia to sit on a Commonwealth Recovery Action Group for threatened species.

Albert is a strong leader in his community, a former Director of the Kimberley Land Council and he sits on numerous boards of peak indigenous organisations in the region. He has presented keynote talks throughout Australia and has presented his own TEDx talk about the importance of recognising indigenous knowledge as science.

Albert considers himself an educator and has featured in several environmental documentaries for various networks. He also works in the media industry as a television presenter for the Australian Broadcasting Corporation and is a host of a travel program called Backroads. He has co-produced his own feature documentary called 'Undermined: Tales From The Kimberley' (available on Amazon Prime) and has toured international stages as a speaker and musician with stars such as John Butler, Missy Higgins and Xavier Rudd, just to name a few.

ISTS40 WORKSHOPS

Note: Full descriptions of workshops are available on the symposium website

FRIDAY 25th MARCH

Workshop 1: Understanding and quantifying cumulative and synergetic stressors to sea turtles

Organiser: Mariana Fuentes

Room: Meeting Room 4

Description: Sea turtles experience multiple stressors across all of their life stages. The cumulative effects of multiple stressors are magnified by synergistic interactions, which can cause more impact than the additive impact of individual stressors. However, impact assessments from stressors on sea turtles are typically focused on isolated stressors at a particular time and location. Relatively few studies have investigated cumulative, synergistic, and secondary effects of different stressors across a broad spatial scale, this masks the real magnitude of potential impacts on sea turtles since the cascading effects caused by synergies are unaccounted for. This lack of consideration for cumulative and synergetic stressors is mainly driven by the lack of knowledge on the effects of interactions and the existence of appropriate approaches to quantify synergies. This workshop aims to highlight this issue and to start discussions to advance how we account for cumulative and synergetic threats. The workshop will be interactive and consist of a presentation setting the issue and bringing attention to approaches used by other fields to address the complex nature of threat assessments. This will be followed by interactive exercises to better understand the synchronous and asynchronous nature of stressors to sea turtles across multiple life-stages and environments and discussions on how we can move forward in this field. Participants should be invested in the topic and ready to contribute and participate.

Workshop 2: Combatting Global Marine Tortoiseshell Trade

Organisers: Brad Nahill, Christine Hof, Michael Jensen, Alex Robillard

Room: Meeting Room 2

Description: Despite the international tortoiseshell trade closure in the 1990s, the illegal marine turtle trade continues in many countries worldwide, threatening the species' nascent recovery. With a marine turtle supply chain now more fragmented and opaque – making policy making and enforcement increasingly difficult - this workshop will bring together advocates and organizations working in this space to learn of recent research and new tools to combat the marine turtle trade, and be given the opportunity to share perspectives on what is working and what is not to reduce the illegal trade.

In this workshop, we offer training sessions on a newly developed app that can recognize fake vs real tortoiseshell from photos and on ShellBank – a program that is using DNA samples to determine where illegally traded shells are originating. Following, groups and individuals working on marine turtle trade will be provided with the opportunity to share their latest work and project outcomes, with a forum discussion on the efforts required to collectively reduce the illegal trade. Breakout sessions provide all participants an opportunity to further network with colleagues from around the world on tackling this important issue.

Workshop 3: Single Species Action Plan for the Loggerhead Turtle (*Caretta caretta*) in the South Pacific Ocean

Organisers: Karen Arthur, Duane March

Room: Meeting Room 3

Description: The Single Species Action Plan for the Loggerhead Turtle (*Caretta caretta*) in the South Pacific Ocean (Loggerhead SSAP) was agreed by the Conference of the Parties to the Convention on the Conservation of Migratory Species (CMS) in 2014. The life cycle of loggerheads in the south Pacific is known to encompass the entire south Pacific Ocean basin with turtles nesting in Australia and New Caledonia, post-hatchlings dispersing across the Pacific to South America and then settling in foraging grounds across the entire region. As such, the recovery of this threatened stock is the responsibility of nations across the south Pacific.

ISTS40 provides an opportunity to bring together range states and other interested parties to revisit the Loggerhead SSAP. The workshop will discuss the implementation of the SSAP, its success, limitations and a way forward. The workshop is intended to reconnect range states, researchers and communities across the region. It will open a dialog about progress implementing the SSAP, share contemporary information about the stock and threats affecting loggerhead turtles in the south Pacific. The workshop will also identify gaps in knowledge or management that would benefit from immediate on ground action.

The purpose of the workshop is to reignite a specific focus on loggerheads in the south Pacific, assess whether the plan is still fit for purpose and identify priority projects that need to continue in the region or be initiated to support the recovery of this population.

Workshop 4: Assessment of the Conservation Status of Hawksbill Turtles in the IOSEA Region – Launch of Publication and Introduction to TurtleNet

Organisers: Mark Hamann, Heidrun Frisch-Nwakanma

Room: Meeting Room 1

Description: At the workshop, we will launch the latest in a series of assessments undertaken by the Advisory Committee of the IOSEA Marine Turtle MOU: a review of the conservation status of the hawksbill turtle (Eretmochelys imbricata) with regard to its distinct management units within the IOSEA region. The authors collated and synthesised information from the scientific and grey

literature, national reports from Signatory States to the MOU, and experts within each of the four IOSEA sub-regions. Case studies presenting the situation in different rookeries will be considered, and recommendations discussed.

In undertaking the 'Hawksbill Assessment', authors have been able to make extensive use of TurtleNet, an interactive atlas that shows nesting, courtship, feeding and migration routes of marine turtles launched in June 2021. Participants will be given an introduction to the functionalities of this tool and see how they can make use of it for their own applications.

Workshop 5: Light Pollution Solutions for Sea Turtles (Sponsored by Department of Agriculture, Water and the Environment)

Organisers: Karen Arthur, Cesar San Miguel, Rachel Tighe, Kate Hofmeister

Room: Meeting Room 4

Description: Light pollution is increasing globally by ~2 % per year and is a common problem near turtle nesting beaches. Artificial light can disrupt critical behaviours in sea turtles. Nesting female turtles may avoid artificially lit beaches and hatchling turtles may not be able to find the ocean when coastal areas are artificially lit at night, making them more vulnerable to predation. Recent studies have demonstrated that hatchlings in the water are attracted to light, which may delay their dispersal to the open ocean or trap them in light pools increasing their risk of predation at sea.

In 2020, Australia released the National Light Pollution Guidelines for Wildlife including Marine Turtles, Seabirds and Migratory Shorebirds. These Guidelines were endorsed by the 132 member states of the Convention on the Conservation of Migratory Species of Wild Animals. The guidelines provide a framework for managing and assessing the impacts of light pollution for wildlife with specific advice for management for marine turtles. At the local level the Queensland Government has introduced Sea Turtle Sensitive Areas into local planning schemes and the new Model Lighting Ordinance provides protection for turtles nesting in Florida.

The virtual Light Pollution Solutions for Sea Turtles workshop will explore practical on ground solutions to managing the impacts of artificial light for sea turtle. It will include presentations from researchers, engineers, lighting designers, managers, and policy makers to explore the latest research and technology to address these challenges. The workshop will also examine appropriate methods for measuring light, human behaviour change, regulation and education and outreach. Presentations will be followed by question and answer opportunities, and attendees will be able to share lessons learned from their experience of light management through breakout sessions.

Workshop 6: Bridging the gaps: The Asia-Pacific Marine Turtle Genetic Working Group

Organiser: Alessandro Ponzo

Room: Meeting Room 2

Description: The Asia Pacific region hosts many globally significant nesting and foraging populations of six species of marine turtles and a few collaborative genetic studies have been previously successfully conducted. Access to genetics laboratories has becoming more common across the region, and more studies are incorporating genetic aspects into their projects. Given the increased accessibility to genetic laboratories, there is a need to further enhanced in-country capacity to develop and carry out genetic research studies and to facilitate region-wide studies. As such, there is also a need to standardize methods and collaboration between groups to ensure work can be compared and combined for effective analysis.

In response to these needs, in late 2020 the Asia Pacific Marine Turtle Genetic Working Group was established to bring together researchers from the region that have access to marine turtle ecological data, tissue samples or genetic laboratories, and that are interested in supporting or leading genetic studies. A series of monthly workshops and meetings have been hosted virtually since January 2021 with participants from Asia, and an upcoming series of workshops will provide a similar opportunity for researchers from the Pacific Island region.

This workshop will provide the opportunity to bring the two groups together, and allow to expand the participation to new interested researchers. Participants will be invited from countries throughout East and South Asia and the West Pacific in order to build on existing local and international collaborations and further this regional initiative.

The workshop will include a series of short presentations to provide updates on the status of the genetic work in the Region, new technologies and current collaborative projects, as well as a facilitated discussion to identify research priorities and gaps, both in sampling and analysis.

Workshop 7: How to quantitatively describe correlations between sea turtle movement and ocean surface current

Organiser: Yaoting Tseng

Room: Meeting Room 3

Description: The purpose of this workshop is to let the participants understand how to quantitatively describe sea turtle movement model through the studies of satellite monitored data and ocean surface current (OSC) data. The OSC data were obtained from the product of Ocean Surface Current Analyses Real-time (OSCAR), a NASA funded research project and global surface current database managed by Earth & Space Research (ESR). The OSCAR data are formatted in netCDF (see https://www.unidata.ucar.edu/) and valid for describing surface currents within a water depth of 15 meters, which should be appropriate for describing our species movement. Learners of this workshop will have the chance to work with the organizer

through the data processing steps required for quantitatively describing the correlations between sea turtle movement and concurrent OSC field, which are both vector data types. The time-dependent correlation between an animal's instantaneous orientation and OSC vector was measured by an index developed by the organizer, which will be shown to the participants in the workshop. The monitored post-nesting hawksbill turtles were tagged with Platform Transmitter Terminals (PTTs) made by Wildlife Computers Inc. (Redmond, Washington, USA) and the females were released back to the sea in July-September 2016. Immediately after the releases from their nesting sites, the tagged animals were telemetrically monitored by the ARGOS satellite system.

The data processing tasks were made on Matlab and the developed Matlab scripts will be released to the participants in advance, or after the workshop. It is highly suggested that participants of this workshop can have their own Matlab environment ready during the workshop so that they can put their hands on the real data processing steps and understand if there will be any problems in their own Matlab environment.

In addition to the introduction of the program background, limitations and applicability of the proposed sea turtle movement model will be also discussed. Finally, participants are welcomed to discuss their own sea turtle monitoring problems, share their own research directions and expectations and see if the organizer can also learn from the participants' experiences. Hence, the proposed workshop will finally finish from the fixed half day (4 hours) time schedule with a half-hour or one hour discussion for this particular sea turtle monitoring problem.

Workshop 8: Sea Turtle Medicine, Rehabilitation and Rescue Workshop

Organiser: Daniela Freggi

Room: Meeting Room 4

Description: Sea turtle rehabilitation is a challenge that more and more facilities are facing, often with a lack of sufficient resources in their region. The implementation of new medical procedures, protocols, and surgical techniques needs to be shared among rescue centers. This workshop is designed to be an opportunity for rehabilitators, veterinarians and biologists involved in sea turtle medical care to share experiences and knowledge related to medicine, rehabilitation and health issues, with the final goal to develop a virtual community where to ask for advice.

In the first part of the workshop, lectures from experienced professionals will be presented in an open forum format to allow for free-flowing discussion between lecturers and attendees. The workshop will be focused on critical care, emergency medicine, diagnostics, anesthesia and surgery, husbandry, and other topics designed for a general audience.

In the second part of the workshop, we plan to offer the chance to “Meet your Specialist”, where participants will have the opportunity to directly discuss particular individual cases with experts.

Workshop 9: New partnerships towards an efficient conservation of sea turtles along the Atlantic and Mediterranean coasts of Africa

Organiser: Alexandre Girard

Room: Meeting Room 1

Description: This workshop is organized by RASTOMA, the Network of Sea Turtle Conservation Actors in Central Africa in partnership with WATSCON, the West African Sea Turtle Conservation Network and NAST-Net, the North African Sea Turtle Network. The workshop's main objectives are to design a new action plan and create innovative and strategic new alliances to succeed in preserving endangered sea turtles and their natural habitats along the Atlantic coast of Africa (including Cape Verde islands) and North Africa (South Mediterranean).

Workshop 10: The ICAPO network: the Eastern Pacific hawksbill research and conservation: current status

Organiser: Ingrid Yañez

Room: Meeting Room 3

Description: More than 10 years have passed since important hawksbill nesting and foraging sites were "rediscovered" along the Eastern Pacific rim. The number of robust research and conservation programs, as well as the amount of information that has been generated since that time is truly staggering. The conservation outlook for the species is currently much more optimistic than it was only a short time ago. Numerous individuals and organizations, including the ICAPO network, have played an important role in catalyzing many of the past and current successes. During this workshop, organizations and individuals will share their efforts to research and conserve hawksbill turtles in the region. Individuals will be asked to give presentations that will include past, present and future activities, with a focus on discussing methods, results, challenges and successes. There will also be a presentation on the ICAPO network itself, with a discussion on how the network should continue to function in the future.

Workshop 11: Student Committee Workshop: How to Succeed in the Turtle World and Beyond

Organisers: Alexandra Fireman, Gabi Arango, Matthew Ramirez, Renato Saragoça Bruno

Room: Meeting Room 2

Description: This workshop will focus on career advice for students and new graduates. Each the student committee develops a Workshop presenting information on how to find jobs or funding, currently available jobs, and other career advice. We will have guest speakers from a variety of fields who are qualified to offer advice on these subjects. We will also discuss time management and communication skills and other subjects to help students achieve in school.

ISTS40 SCHEDULE AT-A-GLANCE

FRIDAY 25th MARCH AT-A-GLANCE

Help + Information	Lobby	All day
RETOMALA Regional Meeting	Meeting Room 2	1:00 AM – 4:00 AM
Workshop 1: Quantifying Cumulative Stressors to Sea Turtles	Meeting Room 4	1:00 AM – 5:00 AM
Workshop 2: Combatting Global Marine Tortoiseshell Trade	Meeting Room 2	5:00 AM – 9:00 AM
Workshop 3: SSAP for Loggerhead Turtles in South Pacific	Meeting Room 3	5:00 AM – 9:00 AM
Oceania Regional Meeting	Meeting Room 5	7:00 AM – 10:00 AM
Workshop 4: Conservation Status of IOSEA Hawksbills	Meeting Room 1	8:00 AM – 12:00 PM
Workshop 5: Light Pollution Solutions for Sea Turtles	Meeting Room 4	8:00 AM – 12:00 PM
Workshop 6: Bridging the Gaps: Asia-Pacific Genetic Working Group	Meeting Room 2	11:00 AM – 3:00 PM
East Asia Regional Meeting	Meeting Room 5	12:00 PM – 3:00 PM
Workshop 7: Sea Turtle Movement and Ocean Surface Current	Meeting Room 3	1:00 PM – 5:00 PM
Mediterranean Regional Meeting	Meeting Room 1	3:00 PM – 6:00 PM
IOSEA Regional Meeting	Meeting Room 5	3:00 PM – 6:00 PM
Africa Regional Meeting	Meeting Room 2	4:00 PM – 7:00 PM
Workshop 8: Sea Turtle Medicine, Rehabilitation and Rescue	Meeting Room 4	4:00 PM – 8:00 PM
Workshop 9: Conservation of Sea Turtles along the Atlantic and Mediterranean coasts of Africa	Meeting Room 1	7:00 PM – 12:00 AM
Workshop 11: How to Succeed in the Turtle World and Beyond	Meeting Room 2	8:00 PM – 12:00 AM
Workshop 10: ICAPO: Eastern Pacific Hawksbill Research and Conservation: Current Status	Meeting Room 3	10:00 PM – 03:00 AM
WIDECAST (Caribbean) Regional Meeting	Meeting Room 5	11:00 PM – 02:00 AM

ISTS40 SESSION DESCRIPTIONS

ANATOMY, PHYSIOLOGY AND HEALTH

This session includes research on all aspects of sea turtle form and function, as well as the causes and consequences of individual and population-wide health problems and how these relate to the environment. Relevant topics include studies and reports on anatomy, physiology, reproductive biology, thermoregulation, osmoregulation, functional morphology, diseases, veterinary care, rehabilitation, epibionts, parasites, health assessment, embryology, and pathology.

IN-WATER BIOLOGY (BEHAVIOR, ECOLOGY, MIGRATION, TELEMETRY, FORAGING) (Sponsored by the Australian Institute of Marine Sciences; AIMS)

After entering the ocean as hatchlings, sea turtles do not leave the sea again except to nest (or occasionally to bask). This session broadly encompasses the biology of sea turtles in the ocean. It includes research on turtles of all life-history stages, with the goal of better understanding the biology and ecology of turtles in their underwater habitats. Suitable topics include behavioral or observational studies related to migration, diving, foraging, or navigation, as well as sightings, surveys and monitoring of turtles at sea (e.g., in developmental habitats or foraging areas), conservation status evaluations, and the structure and dynamics of populations, subpopulations, and metapopulations. Other topics include telemetry and movements, patterns of resource use and residency, mating behavior and social interactions, feeding behavior and diet composition, the ecological role turtles play in their diverse habitats, and the implications of habitat condition on the health and sustainability of turtles.

NESTING BIOLOGY (ECOLOGY, BEHAVIOR, AND REPRODUCTIVE SUCCESS)

This session will focus on nesting beaches, nesting females, nests, hatchlings, eggs, and closely related topics. Relevant subjects include assessments of nesting population size, modeling of population parameters, long-term monitoring of nesting trends, forecasting population change, behavior of turtles on nesting beaches, hatching/emergence success and hatchling production, sea-finding behavior, environmental impacts on egg viability or nesting, newly discovered or newly colonized nesting areas, and related topics. Reports of nesting activity for short-term periods (<10 years) may be included in the poster session; studies revealing long-term nesting trends may be suitable for oral presentation if they reveal lessons relevant to other geographic areas.

POPULATION BIOLOGY AND MONITORING (STATUS, MODELING, DEMOGRAPHY, GENETICS, NESTING TRENDS, IN-WATER TRENDS

This session focuses on sea turtle population assessments and related topics. Specific topics include: population demography (i.e. survival probabilities, growth rates and reproductive rates); abundance and trends; population structure and population connectivity; population genetics (e.g., mixed stock analysis); management unit/population segment definitions. Studies from both nesting and foraging habitats are welcomed, as are modeling approaches to population biology in which mathematical or simulation models are used to elucidate marine turtle population parameters and vital rates.

FISHERIES AND THREATS

This session focuses on the evaluation of natural and anthropogenic threats that degrade the condition of critical sea turtle habitats, or which increase the risk of mortality and major population declines of sea turtles on any geographic scale. Topics include: fisheries bycatch, characterization of fishing gear and fishing effort, directed take, strandings due to any factor (including cold-stunning), impact of degradation of nesting and feeding habitats, impacts of urban development in coastal areas, and emerging threats from climate change, among others. Presentations may also include evaluation of potential impacts of either known or newly discovered threats, as well as proposed or actual measures taken to reduce risks to turtle populations.

CONSERVATION, MANAGEMENT AND POLICY

This session will highlight work on economic, legal, policy, and management aspects of sea turtles and their conservation. Topics include studies and reports that address issues of legislative support and enforcement, policies and programs that safeguard sea turtles and their habitats, management issues related to sea turtle monitoring and conservation, and related matters. This session will also include reports on the implementation, results, and impact of initiatives and international agreements pertaining to sea turtle protection.

EDUCATION, OUTREACH AND ADVOCACY

Sea turtles cannot be protected or conserved unless people take an interest in their continued survival. This session focuses on innovative educational methods for raising awareness of sea turtles and promoting their conservation in different parts of the world, as well as efforts to develop and enhance advocacy efforts on behalf of sea turtles at any level of community or government. Topics include a broad range of approaches to educational outreach and to advocacy, as well as strategies for influencing decision-makers and efforts to convert potential adversaries (e.g., fishermen or egg poachers) into allies.

SOCIAL, ECONOMIC AND CULTURAL STUDIES

Sea turtles play a crucial role not only in marine ecosystems, but also in human societies. This session includes presentations that broadly explore the human dimension of sea turtles and the importance of turtles in diverse cultures and societies around the world.

Some presentations focus on research projects, but others highlight initiatives related to the conservation of sea turtles and their habitats, or efforts to understand local attitudes toward sea turtles and conservation. Topics include but are not limited to: social science and/or anthropological research; discussions of cultural considerations related to conservation and management; sea turtles in local folklore, mythology, and culture; examinations of conflict and conflict resolution; studies of information and/or technology transfer between local peoples and other experts.

ISTS40 SCHEDULE AT-A-GLANCE

SATURDAY 26th MARCH AT-A-GLANCE

Help + Information	Lobby	All day
Exhibitor/Vendor	Lobby	All day
Poster Viewing	Poster Rooms 1 - 4	From 8:00 am onward
Opening Session	DAWE Plenary Room	8:00 am – 10:30 am
Session 1: Fisheries & Threats #1 (+ Q&A)	DAWE Plenary Room	11:00 am – 12:15 pm
Session 2: Nesting Biology #1 (+ Q&A)	DAWE Plenary Room	12:30 pm – 1:45 pm
Session 3: In-water Biology #1 (+ Q&A)	DAWE Plenary Room	2:15 pm – 3:30 pm
Session 4: Population Biology and Monitoring #1 (+ Q&A)	DAWE Plenary Room	3:45 pm – 5:00 pm
Meet the Poster Author(s) Session #1	Poster Rooms 1 - 4	5:00 pm – 6:00 pm
Session 5: Anatomy, Physiology and Health #1 (+ Q&A)	DAWE Plenary Room	6:00 pm – 7:15 pm
Session 6: Fisheries & Threats #2 (+ Q&A)	DAWE Plenary Room	7:30 pm – 8:45 pm
Session 7: Education, Outreach and Advocacy / Social, Economic and Cultural Studies #1	DAWE Plenary Room	9:00 pm – 10:15 pm

OPENING SESSION

SATURDAY 26th MARCH 8:00 AM-10:30 AM
DAWE PLENARY ROOM

40th International Sea Turtle Symposium

OPENING REMARKS + WELCOME TO COUNTRY

ISTS President Kellie Pendoley
Welcome to the 40th Annual Sea Turtle Symposium

Mervyn (Nick) Abraham
Welcome to Country

Keynote Presentations:

Abigail Ross
Principal Marine Environmental Advisor, Fortescue Future Industries

The Importance of the Energy Transition for Protecting Biodiversity and Mitigating the Effects of Climate Change

Scott Whiting
Principal Research Scientist and Coordinator of NWSFTCP, Department of Biodiversity, Conservation and Attractions (WA State Government)

Turtle Conservation – Playing the Short and Long Games in a Changing World

Albert Wiggan
Indigenous Leader, Environmental Consultant and Social-Emotional Wellbeing Officer

10:30 AM - 11:00 AM: BREAK

11:00 AM: SESSION 1: FISHERIES & THREATS #1

Chairs: Matthew Godfrey, Peter Bradley Richardson

DAWE PLENARY ROOM, 26th MARCH 2022

*Denotes Archie Carr best student paper award candidate; † Denotes Grassroots paper award candidate; Presenting author in **BOLD**

11:00	TWENTY YEARS OF SEA TURTLE STRANDINGS IN NEW CALEDONIA **Tyffen Read** | Richard Farman | Jean-Christophe Vivier | Frederic Avril | Laurent Wantiez
11:12	PLASTIC DEBRIS INGESTED BY SEA TURTLES FROM THE KOREAN WATERS: QUANTITY, SHAPE, ORIGINS, AND POLYMER COMPOSITION ***Yelim Moon** | Gi Myung Han | Won Joon Shim | Jongwook Jeong | Youna Cho | Il-Hoon Kim | Hae-Rim Lee | Sang Hee Hong
11:24	PREVALENCE OF FISHING HOOK TYPE IN INCIDENTAL CAPTURE OF KEMP'S RIDLEY (LEPIDOCHEYLS KEMPII) SEA TURTLES ***†Jillian Western** | Christa Barrett | Theresa Madrigal | Debra Moore
11:36	NEW THREAT ON SEA TURTLES: MASS STRANDING OF TURTLES SUFFERING FROM SHOCK WAVE TRAUMA **Yaniv Levy** | Itzhak Aizenberg | Eran Brokovich | Ilan Nissim | Noam Leader
11:48	ANTIBIOTIC-RESISTANCE OF PSEUDOMONADACEAE AND ENTEROBACTERIACEAE ISOLATED FROM UNHATCHED EGGS OF LOGGERHEAD SEA TURTLES IN THE WESTERN MEDITERRANEAN **Antonino Pace** | Fulvio Maffucci | Chiara Roncari | Andrea Affuso | Gianluca Treglia | Ludovico Dipineto | Sandra Hochscheid
12:00	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 1 PRESENTING AUTHORS**

12:15 PM - 12:30 PM: BREAK

12:30 PM: SESSION 2: NESTING BIOLOGY #1

Chairs: Michael Paul Jensen, Jérôme Bourjea, Mayeul Dalleau, Kelly Stewart

DAWE PLENARY ROOM, 26th MARCH 2022

*Denotes Archie Carr best student paper award candidate; † Denotes Grassroots paper award candidate; Presenting author in **BOLD**

12:30	HATCHING SUCCESS AND PRIMARY SEX RATIOS: CURRENT STATUS AND A 30-YEAR PERSPECTIVE FOR A HAWKSBILL ROOKERY IN ANTIGUA, WEST INDIES

	Andrew S Maurer | Seth P Stapleton | Martha O Burford Reiskind | Jeffrey A Seminoff
12:42	USING IN SITU INCUBATION TIME TO VALIDATE MODELLING OF EMBRYO DEVELOPMENT DURING VARIABLE TEMPERATURES EXPERIENCED IN NATURAL NESTS **David Booth** | Alysabeth Turner | Jacques‐Olivier Laloë | Col Limpus
12:54	STOCK-WIDE ASSESSMENT OF COASTAL VULNERABILITY AT FLATBACK NESTING SITES IN THE PILBARA REGION OF WESTERN AUSTRALIA ***Malindi Gammon** | Nicola Mitchell | Sabrina Fossette
1:06	LONG-TERM CHANGES IN ADULT SIZE OF GREEN TURTLES AT ALDABRA ATOLL ACROSS 35 YEARS AND SEXUAL DIMORPHISM IN THE SOUTHERN SEYCHELLES **Jeanne A Mortimer** | Jennifer Appoo | Bruno Bautil | Michael Betts | April J Burt | Roselle Chapman | John Collie | Jock C Currie | Naomi Doak | Nicole Esteban | Tony Jupiter | Anna Liljevik | Jourdan Terence Mahoune | Catherina Onezia | Pierre Pistorius | Heather Richards | Uzice Samedi | Cheryl Sanchez | Wendy Seabrook | Alex Underwood | Janske van de Commenacker | Rainer von Brandis | Graeme C Hays
1:18	UNDERSTANDING MULTI-SPECIES PREDATION ON EMERGING SEA TURTLE HATCHLINGS ***Casper Avenant** | Glenn Hyndes | Scott Whiting | Sabrina Fosette-Halot | Peter Barnes
1:30	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 2 PRESENTING AUTHORS**

1:45 PM - 2:15 PM: BREAK

2:15 PM: SESSION 3: IN-WATER BIOLOGY #1

Sponsored by: Australian Institute of Marine Science (AIMS)

Chairs: Anton D Tucker, Ana Rita Patrício, Alan Rees, George Shillinger, Jeanette Wyneken

DAWE PLENARY ROOM, 26th MARCH 2022

*Denotes Archie Carr best student paper award candidate; ✝ Denotes Grassroots paper award candidate; Presenting author in **BOLD**

2:15	MOVEMENTS AND DISTRIBUTION OF FLATBACK TURTLES (NATATOR DEPRESSUS) IN WESTERN AUSTRALIA AND OVERLAP WITH MARINE PROTECTED AREAS **Lauren R Peel** | Scott D Whiting | Anton D Tucker | Kellie Pendoley | Paul A Whittock | Luciana C Ferreira | Andrea U Whiting | Jason Rossendell | Glenn McFarlane | Sabrina Fossette

2:27	INTER-NESTING HABITAT USE OF GREEN TURTLES FROM POILÃO ISLAND, WEST AFRICA, AND THE IMPORTANCE OF A MARINE PROTECTED AREA **Julie Mestre** | Cheila Raposo | Rui Rebelo | Aissa Regalla | Alasdair Davies | Ana Rita Patrício
2:39	USING MARINE TURTLES TO IDENTIFY HABITAT AND ASSESS CONNECTIVITY OF THE AUSTRALIAN NORTH AND NORTH-WEST MARINE PARK NETWORKS AND SEA COUNTRY **Michele Thums** | Vinay Udyawer | Ronen Galaiduk | Luciana Ferreira | Ben Radford | Ian Bell | Hamish Campbell | Sabrina Fossette | Mick Guinea | Mark Hamann | Xavier Hoenner | Rod Kennett | Dhimurru Aboriginal Corporation | Col Limpus | Glenn McFarlane | Clive McMahon | Anne O'Dea | Kellie Pendoley | Jason Rossendell | Tony Tucker | Steve Winderlich | Scott Whiting | Claire Streten
2:51	PREDICTING THE NEARSHORE DISPERSAL OF SEA TURTLE HATCHLINGS: A MULTIDISCIPLINARY APPROACH TO ASSESSING DISPERSAL BY COMBINING FIELD DATA WITH SIMULATED TURTLE 'PARTICLES' VIA HYDRODYNAMIC MODELLING **Julian Kalau** | Emma McCall | Daniel Botelho | Louise Bruce | Paul Whittock | Kellie Pendoley | Andrew Smith
3:03	FIRST SATELLITE TRACKING STUDY OF POST-NESTING HAWKSBILL TURTLES ALONG PACIFIC MEXICO; INSIGHTS FROM A SMALL, GENETICALLY ISOLATED AND HIGHLY VULNERABLE ROOKERY **Catherine E. Hart** | Alan A. Zavala-Norzagaray | Alejandro Peña de Niz | Israel Llamas-Gonzalez | Luis Angel Tello-Sahagun | Alexander Gaos | Ingrid Lissette Yañez | César P. Ley-Quiñonez
3:15	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 3 PRESENTING AUTHORS**

3:30 PM – 3:45 PM: BREAK

3:45 PM: SESSION 4: POPULATION BIOLOGY AND MONITORING #1

Chairs: Alexander Gaos, Alessandro Ponzo, Erin Seney, Brian Michael Shamblin

DAWE PLENARY ROOM, 26th MARCH 2022

*Denotes Archie Carr best student paper award candidate; † Denotes Grassroots paper award candidate; Presenting author in **BOLD**

3:45	SEA TURTLE OF THE WORLD GENOME PROJECT **Camila Mazzoni** | Peter H. Dutton | Blair P. Bentley | Oliver Berry | Lisa Komoroske

3:57	SEA SCAPE GENETICS AND THE SPATIAL ECOLOGY OF JUVENILE GREEN TURTLES IN THE SOUTHWEST INDIAN OCEAN **Michael Paul Jensen** | Mayeul Dalleau | Philippe Gaspar | Maxime Lalire | Claire Jean | Stéphane Ciccione | Jeanne A. Mortimer | Mireille Quillard | Coralie Taquet | Andrew Wamukota | Géraud Leroux | Jérôme Bourjea
4:09	GENOMICS ON A WARMING SEA: STRUCTURING AND ADAPTATION OF THE MEDITERRANEAN LOGGERHEAD (CARETTA CARETTA) NESTING POPULATIONS **Anna Barbanti** | Dimitris Margaritoulis | ALan F Rees | Oguz Turkozan | Celal Ulger | Mona Khalil | Robin Snape | Annette C Broderick | Andreas Demetropoulos | Abdulmaula A. Hamza | Yaniv Levy | Marta Pascual | Carlos Carreras
4:21	BIOELECTRICAL IMPEDANCE ANALYSIS ACCURATELY ESTIMATES ADIPOSE TISSUE MASS IN GREEN TURTLES (CHELONIA MYDAS) ***Sara Kophamel** | Leigh C Ward | Dmitry A Konovalov | Ellen Ariel | Diana Méndez | Ian Bell | Nathan Cassidy | Suzanne L Munns
4:33	OPTIMISING METHODOLOGIES FOR ASSESSING TURTLE NUMBERS IN DRONE SURVEYS **Carina Rees** | Graeme C Hays | Holly Stokes | Jeanne Mortimer | Jacques-Oliver Laloe | Nicole Esteban | Kim Stokes
4:45	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 4 PRESENTING AUTHORS**

5:00 PM – 6:00 PM: MEET THE POSTER AUTHOR(S) SESSION #1

POSTER ROOMS 1 – 4, 26th MARCH 2022

6:00 PM: SESSION 5: ANATOMY, PHYSIOLOGY AND HEALTH #1

Chairs: Kimberly Finlayson, Maximilian Polyak, Roldan Valverde, Erina J Young

DAWE PLENARY ROOM, 26th MARCH 2022

*Denotes Archie Carr best student paper award candidate; † Denotes Grassroots paper award candidate; Presenting author in **BOLD**

6:00	PLASMA HORMONE LEVELS IN THE GREEN TURTLE CHELONIA MYDAS REARED UNDER CAPTIVITY AS A TOOL TO PREDICT MATING AND OVIPOSITION Olga Rubin | Yaniv Levy | **Joseph Aizen**
6:12	DEVELOPMENTAL STAGES AND CONGENITAL MALFORMATIONS OF DEAD EMBRYOS AND HATCHLINGS IN HATCHERY RELOCATED CLUTCHES OF GREEN TURTLES (CHELONIA MYDAS) IN SRI LANKA **Santhushya Hewapathiranage** | Andrea D Phillott | Rupika Subashini Rajakaruna

6:24	HEMATOLOGY, BLOOD GASES AND BIOCHEMISTRY PROFILES OF WILD-NESTING SEA TURTLES IN TERENGGANU, MALAYSIA ***†Syamsyahidah Samsol**
6:36	EVALUATION OF THE PRESENCE OF MICRONUCLEI IN ERYTHROCYTES OF GREEN TURTLES (CHELONIA MYDAS LINNEAUS, 1758) FROM THE URUGUAY COAST ***Andrea Carolina Porpatto** | Florencia David | Gabriela Vélez-Rubio | Adriana Manzano
6:48	FIRST RECORD OF ARRHYTHMIA ASSOCIATED WITH OVIPOSITION REVEALED BY NON-INVASIVE HEART RATE MONITORING OF GRAVID LOGGERHEAD TURTLE **Tomoko Narazaki** | Ayaka Saito | Masanori Mori | Miho Ito | Masanori Kurita | Shiho Sato | Maho Kawamoto | Kentaro Q. Sakamoto
7:00	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 5 PRESENTING AUTHORS**

7:15 PM – 7:30 PM: BREAK

7:30 PM: SESSION 6: FISHERIES & THREATS #2

Chairs: Matthew Godfrey, Peter Bradley Richardson

DAWE PLENARY ROOM, 26th MARCH 2022

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7:30	COMPARATIVE STUDY OF A BOTTOM-SET GILLNET DESIGNED TO REDUCE SEA TURTLE BYCATCH IN THE U.S. MID-ATLANTIC MONKFISH GILLNET FISHERY **Brian Galvez** | Eric Matzen | Henry Milliken | Ellen Keane | Carrie Upite
7:42	DIRECT BEHAVIORAL MEASUREMENTS OF SEA TURTLE INTERACTIONS WITH FISHING GEAR: A PEEK INTO THE BYCATCH BLACK BOX ***Janie L Reavis** | Blair E Witherington | Michael J Bresette | Dale DeNardo | Jesse F Senko
7:54	TRENDS IN SEA TURTLE STRANDING ALONG THE SOUTH WESTERN ITALIAN COASTS, 2007- **Fulvio Maffucci** | Fabio Di Nocera | Domenico Sgambati | Andrea Affuso | Doriana Iaccarino | Emanuele Esposito | Mariapia Ciampa | Antonino Pace | Gianluca Treglia | Chiara Roncari | Nicola Campomorto | Sandra Hochscheid
8:06	INCIDENTAL CAPTURE OF SEA TURTLES IN THE NORTH-EAST ATLANTIC PORTUGUESE PELAGIC LONGLINE FISHERY **Hugo Alexandre Esteves Parra** | Christopher K. Pham | Miguel Machete | Karen A. Bjorndal | Frederic Vandeperre

8:18	A GLOBAL TRAIT-BASED CLIMATE VULNERABILITY ASSESSMENT FOR SEA TURTLE POPULATIONS **Matthew D. Lettrich** | Dorothy M. Dick | Christina Fahy | Roger B. Griffis | Heather L. Haas | T. Todd Jones | Irene K. Kelly | Dennis Klemm | Ann Marie Lauritsen | Christopher Sasso | Barbara A. Schroeder | Jeffrey A. Seminoff | Carrie Upite | Camryn D. Allen | Paolo Casale | Mariana M. P. B. Fuentes | Alexander R. Gaos | Mark Hamann | Lauren Kurpita | Michael J. Liles | Summer L. Martin | Susanna Piovano | Earl Possardt | Vincent Saba | Yonat Swimmer | Manjula Tiwari | Thane Wibbels | Jeanette Wyneken
8:30	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 6 PRESENTING AUTHORS**

8:45 PM – 9:00 PM: BREAK

9:00 PM: SESSION 7: EDUCATION, OUTREACH AND ADVOCACY / SOCIAL, ECONOMIC AND CULTURAL STUDIES #1

Chairs: Andrea Phillott, Hector Alonso Barrios-Garrido, Seh Ling Long, Zoe A. Meletis

DAWE PLENARY ROOM, 26th MARCH 2022

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9:00	STILL SWIMMING WITH TURTLES – THE IMPACT OF COVID-19 ON TOURIST-TURTLE INTERACTIONS IN THE MALDIVES **Stephanie Koehnk** | Emily Mundy | Jillian Hudgins | Martin Stelfox
9:12	INVESTIGATING BEHAVIOURS FROM ILLEGAL SEA TURTLE TRADE IN CABO VERDE BY ADAPTING A COMPREHENSIVE BEHAVIOURAL MODEL **Morgan Casal-Ribeiro** | Juan Patino-Martinez | Janete Agues | Alexandra Marçal-Correia | Ana Nuno
9:24	RETOMALA ON-LINE: A PERTINENT SOLUTION DURING PANDEMIC OUTBREAK **Hector Alonso Barrios-Garrido** | Rocio Alvarez-Varas | Raul Garcia-Varela | Juan Manuel Rguez-Baron | Daniela Rojas-Canizales
9:36	WHAT DO TOURISTS LIKE? KEY ELEMENTS FOR A SATISFACTORY TURTLE TOUR IN TORTUGUERO, COSTA RICA **Jimena Gutiérrez-Lince** | Marlenne Vázquez Cuevas | Jaime Restrepo | Roldan A. Valverde

9:48	THE LAST TWO NESTING GREEN SEA TURTLES (CHELONIA MYDAS): AN INCENTIVE TO MOBILIZE THE PRESERVATION AND ADVOCACY OF NESTING BEACHES IN REUNION ISLAND **Anne-Emmanuelle Landes** | Léo Pairain | Claire Jean | Stéphane Ciccione
10:00	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 7 PRESENTING AUTHORS)**

ISTS40 SCHEDULE AT-A-GLANCE

SUNDAY 27th MARCH AT-A-GLANCE

Help + Information	Lobby	All day
Exhibitor/Vendor	Lobby	All day
Poster Viewing	Poster Rooms 1 - 4	All day
Session 8: Nesting Biology #2 (+ Q&A)	DAWE Plenary Room	4:00 am – 5:15 am
Session 9: Population Biology and Monitoring #2 (+ Q&A)	DAWE Plenary Room	5:30 am – 6:45 am
Session 10: Anatomy, Physiology & Health #2 (+ Q&A)	DAWE Plenary Room	7:00 am – 8:15 am
Meet the Poster Author(s) Session #2	Poster Rooms 1 - 4	8:15 am – 9:15 am
Session 11: In-water Biology #2 (+ Q&A)	DAWE Plenary Room	9:15 am – 10:30 am
Student Mixer + Speed Chatting with the Experts #1	ConocoPhillips Lounge	10:30 am – 11:30 am
Session 12: In-water Biology #3 (+ Q&A)	DAWE Plenary Room	11:30 am – 12:45 pm
Session 13: Conservation, Management and Policy #1 (+ Q&A)	DAWE Plenary Room	1:00 pm – 2:00 pm
Session 14: Population Biology and Monitoring #3 (+ Q&A)	DAWE Plenary Room	2:30 pm – 3:45 pm
Meet the Poster Author(s) Session #3	Poster Rooms 1 - 4	3:45 pm – 4:45 pm
Session 15: In-water Biology #4 (+ Q&A)	DAWE Plenary Room	4:45 pm – 6:00 pm
Session 16: Conservation, Management and Policy #2 (+ Q&A)	DAWE Plenary Room	6:15 pm – 7:30 pm
Session 17: Nesting Biology #3 (+ Q&A)	DAWE Plenary Room	7:45 pm – 9:00 pm
Speed Chatting with the Experts #1	ConocoPhillips Lounge	9:00 pm – 10:00 pm

4:00 AM: SESSION 8: NESTING BIOLOGY #2

Chairs: Michael Paul Jensen, Jérôme Bourjea, Mayeul Dalleau, Kelly Stewart

DAWE PLENARY ROOM, 27th MARCH 2022

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4:00	THE IMPACTS OF NEST TEMPERATURES ON LEATHERBACK (DERMOCHELYS CORIACEA) HATCHLING PERFORMANCE AND MORPHOLOGY ***Heather Seaman** | Sarah Milton
4:12	NEAR-SHORE MORTALITY'S ROLE IN SEA TURTLE HATCHLING EVOLUTION ***Max Gotts** | Aimee L. Hoover | Nicole Barbour | Helen Bailey | George L. Shillinger
4:24	EXPOSURE AND CONSEQUENCES OF WAVE WASH-OVER FOR LOGGERHEAD SEA TURTLE NESTS IN THE NORTHERN GULF OF MEXICO **Matt Ware** | Simona Ceriani | Joseph Long | Mariana Fuentes
4:36	RELOCATING GREEN TURTLE NESTS TO OPEN BEACH AREAS PRODUCE HIGHLY FEMALE-BIASED HATCHLINGS, IMPLICATIONS FOR SEA TURTLE HATCHERY MANAGEMENT **Nicholas Tolen** | Uzair Rusli
4:48	COROZALITO: A NASCENT ARRIBADA NESTING BEACH IN COSTA RICA **Daniela C Rojas-Cañizales** | Carmen Mejías-Balsalobre | Niníve Espinoza-Rodríguez | Vanessa Bézy | Isabel Naranjo | Randall Arauz | Roldán A Valverde
5:00	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 8 PRESENTING AUTHORS**

5:15 AM – 5:30 AM: BREAK

5:30 AM: SESSION 9: POPULATION BIOLOGY AND MONITORING #2

Chairs: Alexander Gaos, Alessandro Ponzo, Erin Seney, Brian Michael Shamblin

DAWE PLENARY ROOM, 27th MARCH 2022

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5:30	FIRST AGE-SPECIFIC VITAL RATE ESTIMATES FOR AUSTRALIA'S ENDEMIC FLATBACK SEA TURTLE (NATATOR DEPRESSUS) BY SKELETOCHRONOLOGY

	Calandra N. Turner Tomaszewicz | Larisa Avens | Jeffrey A. Seminoff | Colin J. Limpus | Nancy N. FitzSimmons | Michael Guinea | Kellie Pendoley | Paul Whittock | Anna Vitenbergs | Scott Whiting | Anton D. Tucker
5:42	REPRODUCTIVE SENESCENCE IN A CAPTIVE GREEN TURTLE POPULATION ***C. George Glen** | José Miguel Ponciano | Walter Mustin | Alan Bruce Bolten | Karen Anne Bjorndal
5:54	GENETIC ASSIGNMENT OF JUVENILE GREEN TURTLES IN THE CENTRAL PACIFIC USING MIXED MOLECULAR MARKERS **John B Horne** | Peter H Dutton | Suzanne Roden | Amy Frey | Michael P Jensen | Erin LaCasella | Summer Martin | T Todd Jones | Shawn Murakawa | Shandell Brunson | George H Balazs
6:06	GENETIC STUDY OF OLIVE RIDLEY NESTS IN SOUTHERN SINALOA, MEXICO, REVEALS ONE OF THE HIGHEST LEVELS OF MULTIPLE PATERNITY AND LOW INCIDENCE OF DOMINANT MALES ***Andrea Colio-Alatorre** | Yazmin Segura-García | Raquel Briseño-Dueñas | María Fernanda Calderón-Campuzano | María de los Angeles Herrera-Vega | F. Alberto Abreu-Grobois
6:18	FROM A GRAIN OF SAND: MONITORING SEA TURTLES AND THEIR PATHOGENS VIA NON-INVASIVE ENVIRONMENTAL DNA ANALYSIS OF NESTING BEACH SAND TRACKS AND OCEANIC WATER ***Jessica Alice Farrell** | Liam Whitmore | Narges Mashkour | Devon Rollinson | Rachel Thomas | Catherine Eastman | Brooke Burkhalter | Kelsey Yetsko | Cody Mott | Larry Wood | Bette Zirkelbach | Lucas Meers | Pat Kleinsasser | Sharon Stock | Elizabeth Libert | Richard Herren | Scott Eastman | Whitney Crowder | Caitlin Bovery | David Anderson | David Godfrey | Nancy Condron | David Duffy
6:30	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 9 PRESENTING AUTHORS**

6:45 AM – 7:00 AM: BREAK

7:00 AM: SESSION 10: ANATOMY, PHYSIOLOGY AND HEALTH #2

Chairs: Kimberly Finlayson, Maximilian Polyak, Roldan Valverde, Erina J Young

DAWE PLENARY ROOM, 27th MARCH 2022

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7:00	SEA TURTLE HEALTH BASELINES: SUPPORTING CONSERVATION SCIENCE IN WESTERN AUSTRALIA

	Erina J. Young | Kristin S. Warren | Nahiid S. Stephens | Scott D. Whiting | Lian Yeap | Rebecca J. Vaughan-Higgins
7:12	A NEW APPROACH TO AN OLD QUESTION: EVALUATION OF ECOLOGICAL BREEDING STRATEGIES IN RIDLEY SEA TURTLES ***Brianna Lynn Myre** | Christine Figgener | Roldan Valverde | Joseph Bernardo | Duncan S. MacKenzie
7:24	THE 'POOPCORN' EXPERIMENT. AN APPROACH FOR DETECTION OF DIGESTIVE MOTILITY DISORDERS, ASSESSING GASTROINTESTINAL TRANSIT TIMES IN MARINE TURTLES ***Daniel Gonzalez-Paredes** | Ellen Ariel | Maria Florencia David | Virginia Ferrando | Helene Marsh | Mark Hamann
7:36	INTRAVENOUS LIPID EMULSION REDUCES SYMPTOMS OF BREVETOXICOSIS IN SEA TURTLES **Justin R. Perrault** | Heather W. Barron | Christopher R. Malinowski | Sarah L. Milton | Charles A. Manire
7:48	REPRODUCTIVE DYNAMICS OF FEMALE GREEN TURTLES (CHELONIA MYDAS) ON THE MISKITO COAST, NICARAGUA, AN IMPORTANT ATLANTIC FORAGING GROUND ***Renato Saragoça Bruno** | Cynthia J. Lagueux | Jeffrey D. Miller | C. George Glen | Alan B. Bolten | Karen A. Bjorndal
8:00	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 10 PRESENTING AUTHORS**

8:15 AM – 9:15 AM MEET THE POSTER AUTHOR(S) SESSION #2

POSTER ROOMS 1 – 4, 27th MARCH 2022

9:15 AM: SESSION 11: IN-WATER BIOLOGY #2

Sponsored by: Australian Institute of Marine Science (AIMS)

Chairs: Anton D Tucker, Ana Rita Patrício, Alan Rees, George Shillinger, Jeanette Wyneken

DAWE PLENARY ROOM, 27th MARCH 2022

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9:15	COMPARISON OF ACOUSTIC AND SATELLITE TELEMETRY AS METHODS FOR QUANTIFYING SPACE USE OF MARINE TURTLES WITHIN FORAGING GROUNDS ***Emily E. Hardin** | Mariana M.P.B Fuentes | Joshua A. Cullen

9:27	INSIGHTS INTO GREEN TURTLE ECOLOGY FROM COMBINING STABLE ISOTOPES WITH ACOUSTIC AND SATELLITE TAGGING **Mat Vanderklift** | Richard Pillans | Jessica Stubbs
9:39	IDENTIFYING THE ISOTOPIC NICHE OF HAWKSBILL SEA TURTLES IN ANTIGUA, WEST INDIES ***Alexandra Lorraine Fireman** | Dong Liang | Seth P. Stapleton | Hannah B. Vander Zanden | Ryan J. Woodland
9:51	STABLE ISOTOPE ANALYSIS REVEALS DIVERGENT FORAGING STRATEGIES OF GREEN, OLIVE RIDLEY, AND LEATHERBACK TURTLES IN NORTHWEST COSTA RICA **Alison J. Meeth** | Nathan J. Robinson | Jeffrey A. Seminoff | Gabriela Blanco | Chelsea Clyde-Brockway | Jordan M. Marshall | Pilar Santidrián Tomillo | Micaela Stange | Frank V. Paladino
10:03	CONNECT 6: A GLOBAL NETWORK ANALYSIS OF MOVEMENTS TRACKED FOR SIX SEA TURTLE SPECIES **Connie Y. Kot** | Sarah DeLand | Sarah K. Poulin | Brendan J. Godley | Graeme C. Hays | Sara M. Maxwell | Bryan P. Wallace | Autumn-Lynn Harrison | Corrie Curtice | Benjamin Donnelly | Ei Fujioka | Daniel C. Dunn | Patrick N. Halpin | MiCO Project Data Contributors
10:15	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 11 PRESENTING AUTHORS**

11:15 AM – 11:30 AM: BREAK

11:30 AM: SESSION 12: IN-WATER BIOLOGY #3

Sponsored by: Australian Institute of Marine Science (AIMS)

Chairs: Anton D Tucker, Ana Rita Patrício, Alan Rees, George Shillinger, Jeanette Wyneken

DAWE PLENARY ROOM, 27th MARCH 2022

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11:30	ECOLOGICAL TRAP OR FAVORABLE HABITAT? FIRST EVIDENCE THAT IMMATURE SEA TURTLES MAY SURVIVE AT THEIR RANGE-LIMITS IN THE NORTH-EAST ATLANTIC **Philippine Chambault** | Philippe Gaspar | Florence Dell'Amico
11:42	DIURNAL HOME-RANGE PATTERNS IN LOGGERHEAD TURTLES **Mark Hamann** | Michelle Perez | Emily Webster | Takahiro Shimada | Col Limpus
11:54	DEVELOPING A STEREO-VIDEO CAMERA EQUIPPED UNOCCUPIED AERIAL VEHICLE FOR MEASURING SEA TURTLES, AND OTHER MARINE FAUNA **Susan Elizabeth Piacenza** | Kenneth John Faller | Nathan Jack Robinson | Tabitha R. Siegfried | Joseph Richard Piacenza

12:06	MACHINE LEARNING AND MULTI-SENSOR TAGS BREATHE NEW LIFE INTO THE SPATIAL ECOLOGY OF SEA TURTLES ***Jenna L. Hounslow** | Sabrina Fossette | Wei Chong | Randa Bali | Anton D. Tucker | Scott D. Whiting | Adrian C. Gleiss
12:18	RESPONSE OF FLATBACK TURTLE HATCHLINGS TO LIGHT EMITTING DIODES AT SEA **Phillipa Wilson** | Kellie Pendoley | Scott Whiting | Charitha Pattiaratchi | Mark Meekan | Michele Thums
12:30	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 12 PRESENTING AUTHORS**

12:45 PM – 1:00 PM: BREAK

1:00 PM: SESSION 13: CONSERVATION, MANAGEMENT AND POLICY #1

Chairs: Nancy FitzSimmons, Tyffen Read, Mariana Fuentes, Simona A Ceriani

DAWE PLENARY ROOM, 27th MARCH 2022

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1:00	LIGHT POLLUTION GUIDELINES FOR WILDLIFE INCLUDING MARINE TURTLES, SEABIRDS AND MIGRATORY SHOREBIRDS **Karen Arthur** | Caesar San Miguel | Scott Whiting | Narelle Montgomery | Fiona Bartlett | Kellie Pendoley
1:12	SEA TURTLE CONSERVATION AND SOCIAL OUTCOMES THROUGH INDIGENOUS INITIATIVES AND COLLABORATIONS IN AUSTRALIA **Scott Whiting** | Dean Mathews | Daniel Oades | Desmond Williams | Fiona Keighran | Damien Pracy | Josie Janz-Dawson | Sabrina Fossette | Jame Gee | Karen Arthur | Tom Vigilante | Andrea Whiting | Colin Limpus | Mark Hamann | Matt Fossey | Kelly Waples
1:24	BENEFITS OF A LEATHERBACK CONSERVATION PROJECT TO LOCAL COMMUNITIES IN AN EXTREMELY POOR REGION IN PAPUA, INDONESIA **Fitryanti Pakiding** | Kartika Zohar | Alberto Yonathan Tangke Allo | Aflia Pongbatu | Manjula Tiwari
1:36	SEA TURTLE CONSERVATION IN CAMBODIA: PROGRESS AND CHALLENGES **Sour Kim** | Henry Duffy
1:48	USING SATELLITE TRACKING TO INFORM CONSERVATION ACROSS OCEAN BASINS AS WELL AS AT LOCAL LEVELS **Graeme C. Hays** | Jeanne A. Mortimer | Alex Rattray | Taka Shimada | Nicole Esteban
2:00	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 13 PRESENTING AUTHORS**

2:15 PM – 2:30 PM: BREAK

2:30 PM: SESSION 14: POPULATION BIOLOGY AND MONITORING #3

Chairs: Alexander Gaos, Alessandro Ponzo, Erin Seney, Brian Michael Shamblin

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2:30	AGE PREDICTION OF MARINE TURTLES WITH AN EPIGENETIC CLOCK **Benjamin Thomas Mayne** | Walter Mustin | Vandanaa Baboolal | Francesca Casella | Katia Ballorain | Mathieu Barret | Mathew Vanderklift | Anton Tucker | Darren Korbie | Simon Jarman | Oliver Berry
2:42	SEA TURTLE HYBRIDS: ANCIENT AND RECENT HYBRIDIZATION PATTERNS IN THE SOUTH ATLANTIC OCEAN FROM WHOLE GENOMES **Sibelle T. Vilaça** | Francesca Raffini | Alessio Iannucci | Angela Formia | Claudio Ciofi | Luciano Soares | Alan Bolten | Karen Bjorndal | Giorgio Bertorelle
2:54	TRACING THE NATAL ORIGINS OF GREEN TURTLES FORAGING IN WATERS OFF SOUTHEASTERN AUSTRALIA **Joanna Day** | Karrie Rose | Jane Hall | Kimberly Vinette Herrin | Duan March | Olivia Pitt | Sigrid Iredell | Libby Hall | Phoebe Meagher
3:06	CITIZEN SCIENTISTS REVEAL THE DISTRIBUTION, ABUNDANCE, AND MAIN THREATS TO THE FORAGING SEA TURTLES IN TAIWAN ***Chia-Ling Fong** | Daphne Z. Hoh | Huai Su | Peng-Yu Chen | Hao-Chih Huang | Chia-Chen Tsai | Nozawa Yoko
3:18	STATISTICAL ESTIMATION OF STAGE-AND-SEX-STRUCTURED POPULATION DYNAMICS MODELS FOR THE GREEN SEA TURTLES IN THE OGASAWARA ISLANDS, JAPAN **Toshihide Kitakado** | Shohei Kobayashi | Hideyuki Tanaka | Takuya Fukuoka | Chihiro Kinoshita | Hideaki Nishizawa | Satomi Kondo
3:30	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 14 PRESENTING AUTHORS**

3:45 PM – 4:45 PM MEET THE POSTER AUTHOR(S) SESSION #3

POSTER ROOMS 1 – 4, 27th MARCH 2022

4:45 PM: SESSION 15: IN-WATER BIOLOGY #4

Sponsored by: Australian Institute of Marine Science (AIMS)

Chairs: Anton D Tucker, Ana Rita Patrício, Alan Rees, George Shillinger, Jeanette Wyneken

DAWE PLENARY ROOM, 27th MARCH 2022

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4:45	EVOLUTIONARY COMPARISONS OF CHELONID ALPHAHERPESVIRUS 5 (CHHV5) GENOMES FROM FIBROPAPILLOMATOSIS-AFFLICTED GREEN (CHELONIA MYDAS), OLIVE RIDLEY (LEPIDOCHELYS OLIVACEA) AND KEMP'S RIDLEY (LEPIDOCHELYS KEMPII) SEA TURTLES ***Liam Whitmore** | Kelsey Yetsko | Jessica Alice Farrell | Annie Page-Karjian | Whitney Daniel | Donna J Shaver | Hilary R Frandsen | Jennifer Shelby Walker | Whitney Crowder | Caitlin Bovery | Devon Rollinson-Ramia | Brooke Burkhalter | Elizabeth Ryan | David J Duffy
4:57	THE BANC D'ARGUIN (MAURITANIA) IS A MAJOR FORAGING AREA FOR GREEN TURTLES IN THE ATLANTIC OCEAN **Ana Rita Patrício** | Cheibani Senhoury | Sidina Ebaye | Nahi El Bar | Dominic Tilley | Joana Hancock | Brendan Godley | Paulo Catry
5:09	UNDERWATER AND AERIAL OBSERVATIONS OF AGGRESSIVE INTERACTIONS AMONG LOGGERHEAD SEA TURTLES OVER FORAGING RESOURCES **Kostas Papafitsoros** | Gail Schofield | Chloe Chapman | Akanksha Shah | Lucy Westover | Liam CD Dickson | Kostas Katselidis
5:21	PATTERNS OF SEA TURTLE DIVING IN VERY SHALLOW WATER **Kimberley L Stokes** | Nicole Esteban | Holly J Stokes | Graeme C Hays
5:33	SNAPPERGPS: DEPLOYMENT OF A LOW-COST SNAPSHOT GNSS RECEIVER TO TRACK LOGGERHEAD SEA TURTLES **Amanda Matthes** | Jonas Beuchert | Alasdair Davies | Juan Patino-Martinez | Alex Rogers
5:45	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 15 PRESENTING AUTHORS**

6:00 PM – 6:15 PM: BREAK

6:15 PM: SESSION 16: CONSERVATION, MANAGEMENT AND POLICY #2

Chairs: Nancy FitzSimmons, Tyffen Read, Mariana Fuentes, Simona A Ceriani

DAWE PLENARY ROOM, 27th MARCH 2022

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6:15	PELAGIC AREAS WITH INCREASED RISK OF EXPOSURE TO MARITIME TRAFFIC FOR LOGGERHEAD TURTLES IN THE TYRRHENIAN (MEDITERRANEAN) SEA **Eugenia Pasanisi** | Marianna Chimienti | Monica Francesca Blasi | Fulvio Maffucci | Sandra Hochscheid
6:27	THE IMPORTANCE OF RAINFALL IN MODULATING HATCHLING SEX-RATIOS AND DETERMINING BREEDING SEX-RATIOS OF SEA TURTLE POPULATIONS IN A WARMING CLIMATE ***Melissa N Staines** | Caitlin E Smith | Christine A Madden-Hof | David T Booth | Ian R Tibbetts | Graeme C Hays
6:39	INCREASING MALE HATCHLING PRODUCTION USING SEAWATER IRRIGATION ***Larissa Rosalie Young** | David Booth | Caitlin Smith | Christine Madden Hof | Melissa Staines | Anne Crosby
6:51	IMPROVISATION OF HATCHERY MANAGEMENT PRACTICE TO MITIGATE THE IMPACT OF THE SHIFT IN THE NESTING SEASON OF OLIVE RIDLEY TURTLES ON THE WEST COAST OF INDIA ***Sumedha Korgaonkar** | Kuppusamy Sivakumar
7:03	SEE SHELL: A DEEP LEARNING MODEL FOR DETECTING HAWKSBILL DERIVED PRODUCTS ***†Alexander J Robillard** | Brad Nahill | Christine Madden Hof | Michael Jensen | Helen Bailey | Christopher Rowe | Vyacheslav Lyubchich | Michael G Trizna | Karla G Barrientos-Munoz | Callie A Veelenturf | Muhammad Jayuli | Hiltrud Cordes | Didiher Chacón Vargas | Didiher Chacón Chaverri | Cristian Ramirez-Gallego | Jeffrey A Seminoff | Rebecca B Dikow
7:15	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 16 PRESENTING AUTHORS**

7:30 PM – 7:45 PM: BREAK

7:45 PM: SESSION 17: NESTING BIOLOGY #3

Chairs: Michael Paul Jensen, Jérôme Bourjea, Mayeul Dalleau, Kelly Stewart

DAWE PLENARY ROOM, 27th MARCH 2022

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7:45	HOW DO INCUBATION SUBSTRATES INFLUENCE HATCHING SUCCESS AND HATCHLING PHENOTYPE? A FIELD AND EXPERIMENTAL STUDY ON LOGGERHEAD SEA TURTLE EGGS

	Juan Patino-Martinez | Jairson Veiga | Inês O. Afonso | Kate Yeoman | José Mangas-Viñuela | Gemma Charles
7:57	INTERNESTING PERIOD AND NESTING FREQUENCY OF THE ENDANGERED POPULATION OF THE LOGGERHEAD TURTLE (CARETTA CARETTA) ON THE ISLAND OF BOA VISTA, CAPE VERDE ***Ana Raposo** | Rui Rebelo | Adolfo Marco
8:09	POPULATION GROWTH AND DYNAMICS IN ASSISTED COLONISATIONS OF GREEN SEA TURTLES IN THE CAYMAN ISLANDS Anna Barbanti | Janice M. Blumenthal | Annette C. Broderick | Brendan J. Godley | Alejandro Prat-Varela | Maria Turmo | **Marta Pascual** | Carlos Carreras
8:21	MOONLIGHT SERENADE: THE ROLE OF SECONDARY ACOUSTIC CUES IN SEA-FINDING BY GREEN (CHELONIA MYDAS), HAWKSBILL (ERETMOCHELYS IMBRICATA), AND LEATHERBACK (DERMOCHELYS CORIACEA) SEA TURTLES ***Bethany Holtz** | TriciaLyn Beamer | Courtney Parks | Gigi Hess | Scott McRobert
8:33	DIFFERENCES IN VISUAL PERCEPTION ARE CORRELATED WITH VARIATION IN SEAFINDING BEHAVIOR BETWEEN HATCHLING LEATHERBACK (DERMOCHELYS CORIACEA) AND LOGGERHEAD (CARETTA CARETTA) MARINE TURTLES ***Samantha Elizabeth Trail** | Michael Salmon
8:45	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 17 PRESENTING AUTHORS**

ISTS40 SCHEDULE AT-A-GLANCE

MONDAY 28th MARCH AT-A-GLANCE

Help + Information	Lobby	All day
Exhibitor/Vendor	Lobby	All day
Poster Viewing	Poster Rooms 1 - 4	All day
Session 18: Population Biology and Monitoring #2 (+ Q&A)	DAWE Plenary Room	2:00 am – 3:15 am
Session 19: In-water Biology #5 (+ Q&A)	DAWE Plenary Room	3:30 am – 4:45 am
Session 20: Anatomy, Physiology & Health #3 (+ Q&A)	DAWE Plenary Room	5:00 am – 6:15 am
Session 21: Population Biology and Monitoring #5 (+ Q&A)	DAWE Plenary Room	7:00 am – 8:15 am
Session 22: In-water Biology #6 (+ Q&A)	DAWE Plenary Room	8:30 am – 9:45 am
Awards + Nomination Outcomes	DAWE Plenary Room	11:45 am – 12:45 pm
Closing Remarks	DAWE Plenary Room	12:45 pm – 1:30 pm

2:00 AM: SESSION 18: POPULATION BIOLOGY AND MONITORING #4

Chairs: Alexander Gaos, Alessandro Ponzo, Erin Seney, Brian Michael Shamblin

DAWE PLENARY ROOM, 28th MARCH 2022

*Denotes Archie Carr best student paper award candidate; † Denotes Grassroots paper award candidate; Presenting author in **BOLD**

2:00	SEA TURTLES ACTUAL STATE IN THE SAO TOME: A GENERAL OVERVIEW OF THEIR REPRODUCTIVE BIOLOGY AND CONSERVATION ***†Betania Ferreira-Airaud** | Sara Vieira | Maria Branco
2:12	USING DATA FROM NESTING BEACH MONITORING AND SATELLITE TELEMETRY TO IMPROVE ESTIMATES OF MARINE TURTLE CLUTCH FREQUENCY AND POPULATION ABUNDANCE ***Armando J B Santos** | Daniel H G Vieira | Claudio Bellini | Gilberto Corso | Simona A Ceriani
2:24	DIVERSITY AND NATAL ORIGINS OF OLIVE RIDLEY SEA TURTLE (LEPIDOCHELYS OLIVACEA) IN SOUTHERN BRAZIL ***Igor Peres Puertas** | Luciana Medeiros | Danielle Monteiro | Maíra Proietti
2:36	EXPLORING THE GENETICS OF 'LOST YEARS' SEA TURTLES IN THE GULF OF MEXICO ***Katrina Phillips** | Katie Martin | Gustavo Stahelin | Anna Savage | Kate Mansfield
2:48	ADAPTIVE IMMUNE GENE EVOLUTION AND FIBROPAPILLOMATOSIS IN JUVENILE GREEN TURTLES (CHELONIA MYDAS) AND LOGGERHEADS (CARETTA CARETTA) ***Katherine R. Martin** | Katherine L. Mansfield | Anna E. Savage
3:00	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 18 PRESENTING AUTHORS**

3:15 AM – 3:30 AM: BREAK

3:30 AM: SESSION 19: IN-WATER BIOLOGY #4

Sponsored by: Australian Institute of Marine Science (AIMS)

Chairs: Anton D Tucker, Ana Rita Patrício, Alan Rees, George Shillinger, Jeanette Wyneken, Brian Michael Shamblin

DAWE PLENARY ROOM, 28th MARCH 2022

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3:30	HIGH NUMBER OF LEATHERBACK TURTLE SIGHTINGS ON BRAZILIAN SUBTROPICAL COASTAL WATERS **Juliana Mello Fonseca** | Fabio Soares Cruz | Mariana Soares | Pedro Mattos Souza | Thiago Leal Tavares | Raquel de Azeredo Muniz
3:42	A COLLABORATIVE PHOTO-ID APPROACH TO DETERMINE SEA TURTLE PARAMETERS IN A ROCKY REEF FORAGING GROUND ***Isabella Neves-Ferreira** | Juliana Mello-Fonseca | Carlos E. L. Ferreira
3:54	SUCCESS WITH PHOTO IDENTIFICATION SOFTWARE USING, HOTSPOTTER, IMPROVES GREEN TURTLE MARK-RECAPTURE EFFORTS ***Hannah Virgin** | Annabelle Brooks | Dustin Baumbach | Stephen Dunbar | Liberty Boyd | Ryley Mayoras | Elizabeth Whitman
4:06	DENSITY ESTIMATES OF IMMATURE FORAGING TURTLES ASSESSED BY DRONE SURVEYS ***Holly J. Stokes** | Graeme C. Hays | Jacques-Olivier Laloë | Jeanne Mortimer | Nicole Esteban
4:18	DYNAMICS AND AGING OF GREEN TURTLE GRAZING PLOTS IN SEAGRASS MEADOWS ***Nerine Constant** | Alan B. Bolten | Robert A. Johnson | Annabelle M. L. Brooks | Karen A. Bjorndal
4:30	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 19 PRESENTING AUTHORS**

4:45 PM – 5:00 PM: BREAK

5:00 AM: SESSION 20: ANATOMY, PHYSIOLOGY AND HEALTH #3

Chairs: Kimberly Finlayson, Maximilian Polyak, Roldan Valverde, Erina J Young

DAWE PLENARY ROOM, 28th MARCH 2022

*Denotes Archie Carr best student paper award candidate; ✝ Denotes Grassroots paper award candidate; Presenting author in **BOLD**

5:00	POTENTIAL USE OF HOST BIOMARKERS FROM TUMOR BIOPSIES FOR PREDICTING THE OUTCOME OF SEA TURTLE PATIENTS WITH FIBROPAPILLOMATOSIS **Samantha A Koda** | Kelsey Yetsko | Nicholas Blackburn | Brooke Burkhalter | Devon Rollinson Ramia | David J Duffy
5:12	MUTATIONAL DRIVERS OF FIBROPAPILLOMATOSIS TUMORS IN GREEN SEA TURTLES **Drew Thompson** | Kelsey Yetsko | Maximilian Stammnitz | Jessica Farrell | Christine Schnitzler | David Duffy
5:24	CONCURRENT PAPILLOMAVIRUS-HERPESVIRUS INFECTION IN GREEN TURTLE FIBROPAPILLOMATOSIS TUMOURS

	Narges Mashkour | Karina Jones | Jessica Farrell | Ellen Ariel | Graham Burgess | David Duffy
5:36	PHARMACOKINETICS AND PHARMACODYNAMICS OF A SINGLE DOSE OF INTRAVENOUS ALFAXALONE IN JUVENILE GREEN SEA TURTLES (CHELONIA MYDAS) **Julie A. Balko** | Kristen M. Messenger | Craig A. Harms
5:48	CALCIUM OXALATE, GREEN TURTLES, AND TURTLE GRASS: WHAT ARE THE INTERACTIONS? ***Ashley M. Kusel** | Paul R. Dominguez Gutierrez | William L. Donelan | Kathleen M. Hanes | Alan B. Bolten | Karen A. Bjorndal
6:00	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 20 PRESENTING AUTHORS**

6:15 AM – 7:00 AM: BREAK

7:00 AM: SESSION 21: POPULATION BIOLOGY AND MONITORING #5

Chairs: Alexander Gaos, Alessandro Ponzo, Erin Seney, Brian Michael Shamblin

DAWE PLENARY ROOM, 28th MARCH 2022

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7:00	WHERE ARE THE LEATHERBACKS? NEST NUMBERS AT SANDY POINT PLUMMET TO LOWEST LEVEL IN 40 YEARS **Kelly R. Stewart** | Claudia D. Lombard | Peter H. Dutton
7:12	MONITORING AND INTENTIONAL CAPTURE PROGRAM OF SEA TURTLES IN A FORAGING AREA IN THE STATE OF RIO GRANDE DO SUL, BRAZIL **Thayana Gião** | Larissa Zangiacomi Andrade | Marco Aurélio Paim da Silva Júnior | Nathalia Rodrigues Peres | Ricardo Escobar Cancelado | Pedro Renato Gonçalves Filho | Gustavo Martinez-Souza
7:24	GENETIC STRUCTURING AND DIVERGENT MEXICAN ORIGINS OF NORTHERN GULF OF MEXICO JUVENILE GREEN TURTLE FORAGING AGGREGATIONS SPANNING TEXAS TO THE FLORIDA KEYS **Brian M. Shamblin** | Kristen M. Hart | Margaret M. Lamont | Donna J. Shaver | Peter H. Dutton | Erin L. LaCasella | Andrew G. Crowder | David C. Roche | Campbell J. Nairn
7:36	IDENTIFYING NESTING STOCK ORIGIN OF HAWKSBILL TURTLES (ERETMOCHELYS IMBRICATA) THROUGH DNA EXTRACTION OF ILLEGAL TORTOISESHELL PRODUCTS **Erin L. LaCasella** | Michael P. Jensen | Christine A. Madden Hof | Ian P. Bell | Amy Frey | Peter H. Dutton

7:48	ANALYSIS OF LEATHERBACK AND GREEN TURTLE GENOMES REVEAL DIFFERENTIAL ADAPTIVE CAPACITY AND DEMOGRAPHIC HISTORIES **Blair Bentley** | Harvinder Pawar | Alana Alexander | Tomas Marques-Bonet | Peter Dutton | Martin Kulwhim | Camila Mazzoni | Lisa Komoroske
8:00	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 21 PRESENTING AUTHORS**

8:15 AM – 8:30 AM: BREAK

8:30 AM: SESSION 22: IN-WATER BIOLOGY #6

Sponsored by: Australian Institute of Marine Science (AIMS)

Chairs: Anton D Tucker, Ana Rita Patrício, Alan Rees, George Shillinger, Jeanette Wyneken, Brian Michael Shamblin

DAWE PLENARY ROOM, 28th MARCH 2022

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8:30	IDENTIFYING PATTERNS IN FORAGING-AREA ORIGINS IN BREEDING AGGREGATIONS OF MIGRATORY SPECIES: LOGGERHEAD TURTLES IN THE NORTHWEST ATLANTIC Joseph Pfaller | **Mariela Pajuelo** | Hannah Vander Zanden | Kimberly M. Andrews | Mark G. Dodd | Matthew H. Godfrey | DuBose B. Griffin | Breanna L. Ondich | S. Michelle Pate | Kristina L. Williams | Brian M. Shamblin | Campbell J. Nairn | Alan B. Bolten | Karen A. Bjorndal
8:42	SEVEN YEARS OF HAWKSBILL TURTLE MONITORING IN THE EASTERN PACIFIC´S MOST IMPORTANT FORAGING SITE **Rodrigo Donadi** | Jeffrey Seminoff | Alexander Gaos | Diego Amorocho | Israel Llamas | Marino Abrego
8:54	DIVING BEHAVIOR AND ENERGETIC STRATEGY OF LEATHERBACK SEA TURTLES DURING INTERNESTING INTERVALS ON ST. CROIX, U.S. VIRGIN ISLANDS **Ayaka Asada** | Scott A. Eckert | Frances P. Gelwick | William H. Hagey | Randall W. Davis
9:06	HOME RANGE AND CORE USE AREAS OF ADULT MALE LOGGERHEADS (CARETTA CARETTA) IN THE GULF OF MEXICO **Kristen Mazzarella** | Shauna McBride-Kebert
9:18	22 YEARS OF FLIPPER TAGGING PROGRAMS: GREEN TURTLE CONNECTIVITY IN FEEDING AND DEVELOPMENTAL GROUNDS OF SOUTHERN BRAZILIAN AND URUGUAYAN COASTAL WATERS **Gabriela Manuela Velez-Rubio** | Henrique Becker | Bruno Giffoni | Danielle Monteiro | Andres Estrades | Ana Cris Bondioli | Paula Canabarro | Camila Domit | Sergio Estima | Alejandro Fallabrino | Daniel Gonzalez-Paredes | Gustavo Martinez Souza |

	Andrine Paiva Da Silva | Daniel Rogeiro | Liana Rosa | Derek Blease | Jeferson Dick | Daniela Godoy | Karina Groch | Aline Kellerman | André Silva Barreto | Jules Soto | Mauricio Tavares | Pedro Volkmer de Castillo
9:30	**15-MINUTE QUESTION AND ANSWER WITH ALL SESSION 22 PRESENTING AUTHORS**

11:45 AM: AWARDS & NOMINATION OUTCOMES

DAWE PLENARY ROOM, 28th MARCH 2022

Awards and ISTS election results for 2023

12:30 PM: CLOSING REMARKS

DAWE PLENARY ROOM, 28th MARCH 2022

ISTS President Kellie Pendoley

POSTER ROOM 1

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POPULATION BIOLOGY

1.A1	ABUNDANCE MONITORING OF OCEANIC-STAGE LOGGERHEAD SEA TURTLES IN THE AZORES: THE IMPORTANCE FOR EFFECTIVE MANAGEMENT **Joana Batalha** | Hugo Parra | Miguel Machete | Marco Santos | Christopher K. Pham | Karen A. Bjorndal | Frederic Vandeperre
1.A2	GEOMETRIC MORPHOMETRY AS A TOOL FOR THE CONSERVATION OF SEA TURTLES ***Ryan Betancourt Avila** | Julia Azanza Ricardo | Randy Calderón Peña
1.A3	OPTIMISED 2B-RAD SEQUENCING PROTOCOL FOR GENOMIC STUDIES ON THE LOGGERHEAD SEA TURTLE (CARETTA CARETTA) Anna Barbanti | Marta Pascual | **Carlos Carreras**
1.A4	GENETIC CHARACTERIZATION OF A PREVIOUSLY OVERLOOKED GULF OF MEXICO GREEN TURTLE (CHELONIA MYDAS) NESTING POPULATION ALONG THE PADRE ISLAND NATIONAL SEASHORE (PAIS) IN TEXAS, USA Donna J Shaver | Erin L LaCasella | Jennifer Shelby Walker | Cynthia Rubio | Amy Frey | **Peter H Dutton**
1.A5	UPWARD TRENDS IN NESTING ABUNDANCE AT AN IMPORTANT INDIAN OCEAN ROOKERY **Nicole Esteban** | Jeanne A Mortimer | Graeme C Hays
1.A6	INTEGRATING CLIMATE CHANGE AND MANAGEMENT SCENARIOS IN A POPULATION MODEL OF THE NORTHERN GREAT BARRIER REEF GREEN TURTLE GENETIC STOCK **Nancy FitzSimmons** | Michael Jensen | Tomoharu Eguchi | Michael McCarthy | Mariana Fuentes | Mark Hamann | Colin Limpus | Ian Bell | Mark Read
1.A7	THE VIRTUAL TURTLES PROJECT: A SOLUTION TO MONITOR MARINE TURTLES WITHOUT MARINE TURTLES **Marc Girondot** | Nicolas J. Pilcher
1.A8	THE USE OF TIME-LAPSE CAMERAS TO DETERMINE PEAK NESTING ACTIVITY AT A REMOTE GREEN TURTLE ROOKERY IN THE NORTHERN TERRITORY, AUSTRALIA **Rachel Alexis Groom** | Philippa Wilson | Katie Oxenham | Michele Thums | Vinay Udyawer
1.A9	NESTING RANGE EXPANSION OF LOGGERHEAD TURTLES IN THE MEDITERRANEAN: PHENOLOGY, SPATIAL DISTRIBUTION AND CONSERVATION IMPLICATIONS **Sandra Hochscheid** | Fulvio Maffucci | Elena Abella | Marco Adolfo | Mohamed Nejmeddine Bradai | Andrea Camedda | Carlos Carreras | Françoise Claro | Giuseppe Andrea de Lucia | Imed Jribi | Cecilia Mancusi | Nicola Marrone | Luana Papetti | Ohiana Revuelta | Salvatore Urso | Jesús Tomás
1.B1	TAKING STOCK OF CRITICALLY ENDANGERED HAWAIIAN HAWKSBILL TURTLES: BREEDING SEX RATIOS AND FEMALE NESTING FREQUENCIES INFERRED FROM

	GENETIC RELATEDNESS **John Barton Horne** | Peter H Dutton | Amy Frey | Alex Gaos
1.B2	CRITICAL NEST PROTECTION OF LEATHERBACK TURTLES ON TWO REMOTE ISLANDS IN SOLOMON ISLANDS **†Cameron Masakolo** | Johnson Haro | Alec Hughes | Robert Howard | John Read | Katherine Moseby
1.B3	SLOW AND STEADY WINS THE IN-WATER PHOTO-ID CATALOG RACE TO 300 INDIVIDUAL HAWAIIAN HAWKSBILLS: IT ONLY TOOK NEARLY A QUARTER OF A CENTURY! **Cheryl S. King**
1.B4	ASSESSING SEA TURTLE INCUBATION TEMPERATURES OVER 100-YEARS OR MORE **Jacques-Olivier Laloë** | Nicole Esteban | Graeme C. Hays
1.B5	FORTY YEAR ANALYSIS OF SEA TURTLE NESTING BEHAVIOR ON A LARGE GULF OF MEXICO ROOKERY **Jake Lasala** | Kristen Mazzarella | Melissa Macksey
1.B6	OVERVIEW OF MARINE TURTLES NESTING AT THE JEEN WOMOM COASTAL PARK, TAMBRAUW REGENCY, PAPUA BARAT **Deasy Natalia Lontoh** | Yairus Swabra | Petrus Batubara | Abraham Leleran | Johni Mau | Siis Werimon | Tonny Duwiri | Arfiandra Wanaputra | Manjula Tiwari | Fitryanti Pakiding
1.B7	NOAA FISHERIES NATIONAL PROTECTED SPECIES TOOLBOX INITIATIVE **Erin McMichael** | Mridula Srinivasan | Patrick Lynch
1.B8	SURVEYS OF THE ANGOLAN COAST UNCOVER THE LARGEST OLIVE RIDLEY NESTING POPULATION IN THE ATLANTIC **Miguel Veríssimo Morais** | Manjula Tiwari
1.B9	POPULATION VIABILITY ANALYSIS TO EXPLORE SOURCES FOR DEMOGRAPHIC RESCUE OF THE IMPERILED EAST PACIFIC LEATHERBACK SEA TURTLE ***Anna Antonia Ortega** | Nicola J Mitchell | Phillip S Miller | Sean A Williamson | George L Shillinger
1.C1	POPULATION GENOMICS OF NON-MODEL SPECIES: HELPING DECISION-MAKING FOR A RELIABLE AND COST-EFFECTIVE GENOTYPING Anna Barbanti | Hector Torrado | Enrique Macpherson | Carlos Carreras | **Marta Pascual**
1.C2	GENETIC ANALYSIS OF THE HAWKSBILL SEA TURTLE (ERETMOCHELYS IMBRICATA) FROM THE MEXICAN CARIBBEAN SEA AND PACIFIC REGION USING CONTROL REGION SEQUENCES **Irlanda Esmeralda Gallardo-Alanís** | Fátima Yedith Camacho-Sánchez | Blanca Idalia González-Garza | Cesar Ley-Quiñonez | Alan A. Zavala-Norzagaray | José Alberto Narváez-Zapata | Israel Llamas-Gonzalez | Luis Angel Tello-Sahagún | Caterine E. Hart | A. Alonso Aguirre | Miguel Angel Reyes-Lopez
1.C3	AI-BASED TECHNOLOGY FOR AUTOMATIC CLASSIFICATION OF SPECIES OF SEA TURTLES Jorge L. Compean-Aguirre | **Mario López-Rodriguez** | Alejandro A. Ramírez-Acosta |

	Ciro A. Martínez-García-Moreno | Fátima Yedith Camacho-Sánchez | Miguel Angel Reyes Lopez | Mireya S. García-Vázquez
1.C4	USING A PHOTOGRAMMETRIC MARK-RECAPTURE APPROACH TO DENOTE SEA TURTLE ENCOUNTERS WITHIN THE NORTHERN GULF OF MEXICO ***Emma Roberto** | Lauren Bednaroski | Jackson Reimer | Tabitha Siegfried | Susan Piacenza
1.C5	NUCLEAR DNA MARKERS PROVIDE FURTHER INSIGHT INTO PACIFIC GREEN TURTLE POPULATION STRUCTURE **Suzanne E. Roden** | John B. Horne | Michael P. Jensen | Nancy N. FitzSimmons | Amy Frey | Lisa M. Komoroske | Maike Heidemeyer | George H. Balazs | Cristian M. Cayanan | I-Juinn Cheng | Richard Farman | Jessy R. Hapdei | Jennifer Cruce Horeg | Brian Peck | Rotney Piedra | Tammy M. Summers | Miri Tatarata | Shawn B. Wusstig | T. Todd Jones | Summer L. Martin | Shawn Murakawa | Elizabeth Velez | Patricia Zárate | Adriana Laura Sarti-Martinez | Peter H. Dutton
1.C6	GENETIC DIVERSITY OF LEPIDOCHELYS OLIVACEA IN THE NESTING COLONY LA IXTAPILLA, MICHOACAN **Ángela Patricia Rojas-Cortés** | Omar Chassin Noria
1.C7	MITOCHONDRIAL CONTROL REGION AND REPEAT SEQUENCES RESOLVE POPULATION STRUCTURE OF FLORIDA'S GULF OF MEXICO GREEN TURTLE ROOKERIES **Brian Michael Shamblin** | Kristen M. Hart | Simona A. Ceriani | Margaret M. Lamont | Zoé M. Bass | Wilma Katz | Kristen T. Mazzarella | Kelly A. Sloan
1.C8	USING DISTANCE METRICS AND TEMPORAL TRENDS TO REFINE MIXED STOCK ANALYSES ***Gustavo David Stahelin** | Pedro F. Quintana-Ascencio | Eric Hoffman | Monica Reusche | Kate Mansfield
1.C9	A NEW MOLECULAR METHODOLOGY FOR MONITORING THE MEDITERRANEAN GREEN TURTLE POPULATION AND THE ISRAELI BREEDING STOCK **Yaron Tikochinski**
1.D1	INVESTIGATING THE RELATIONSHIP BETWEEN CHELONIID HATCHLING SEX AND GROWTH RATE IN CAPTIVE CONDITIONS INVESTIGATING THE RELATIONSHIP BETWEEN CHELONIID HATCHLING SEX AND GROWTH RATE IN CAPTIVE CONDITIONS ***Emily Turla** | Jeanette Wyneken
1.D2	OVERVIEW OF A FACILITATED DECISION-MAKING WORKSHOP PROCESS, INFORMED BY POPULATION VIABILITY ANALYSIS, TO PROVIDE RECOMMENDATIONS ON IMPLEMENTING EX SITU CONSERVATION ACTIONS TO PREVENT THE EXTINCTION OF THE EASTERN PACIFIC LEATHERBACK POPULATION **Sean Williamson** | Jeanette Wyneken | Richard Reina | Nicki Mitchell | Anna Ortega | George Shillinger

EDUCATION, OUTREACH & ADVOCACY

1.D3	SEATURTLESIGHTINGS.ORG – VESSEL OPERATOR OUTREACH/EDUCATION/ OCCURRENCE DATA **Karen Moore Dourdeville** | Robert L Prescott

1.D4	THE AGA SEA TURTLE EXHIBITION: AN ADAPTABLE EDUCATION TOOL TO BUILD ECOLOGICAL AWARENESS AND FOSTER RESPONSIBLE BEHAVIOR IN TOURISTS' HOME COUNTRIES AND ON SITE **Miriam S. Mueller** | Birgit Braun | Stephan Kieninger
1.D5	IMPLEMENTING A LIGHT POLLUTION MITIGATING SYSTEM; A COMMUNITY BASED INITIATIVE BY SEA TURTLE CONSERVANCY'S JUNIOR ASSISTANTS AT TORTUGUERO, COSTA RICA **Laia Nadal Agullo** | Jaime Restrepo | Roldán A. Valverde
1.D6	TEACHING EVIDENCE-BASED PROTECTION OF SEA TURTLE EGGS **Andrea D. Phillott** | Nupur Kale
1.D7	CAREY'S SALE IN BOGOTÁ **Diana del Pilar Ramirez**
1.D8	GLOBAL DISTRIBUTION OF PUBLIC HEALTH RISKS LINKED TO SEA TURTLES' SPECIMEN CONSUMPTION **Claire Saladin** | Rebecca Regnery
1.D9	LAMPEDUSA, A PLATFORM IN THE MIDDLE OF THE MEDITERRANEAN: A CASE STUDY ON THE SOCIAL AND ECOLOGICAL IMPACTS ON A SEA TURTLE CONSERVATION PROJECT ***Denise Cordeiro Soares** | Josie Lawrence | Marina Zucchini | Daniela Freggi

POSTER ROOM 2

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ANATOMY, PHYSIOLOGY & HEALTH

2.A1	ULTRASOUND IMAGING OF OVARIES AND EGGS IN LOGGERHEAD TURTLES (CARETTA CARETTA) IN THE ADRIATIC SEA (ITALY) **Stefano Ciccarelli** | Delia Franchini | Serena Paci | Carmela Valastro | Daniela Freggi | Pasquale Salvemini | Davide Bellomo | Antonio Di Bello
2.A2	SEVERE PNEUMOCELOMA ASSOCIATED WITH FISHING LINE CROSSING THE DIGESTIVE CANAL IN THREE LOGGERHEADS (CARETTA CARETTA) **Antonio Di Bello** | Stefano Ciccarelli | Carmela Valastro | Serena Paci | Francesco Caprio | Daniela Freggi | Delia Franchini
2.A3	IS DROWNING OR GAS EMBOLISM THE LEADING CAUSE OF DEATH OF TRAWLED TURTLES? **Delia Franchini** | Stefano Ciccarelli | Serena Paci | Carmela Valastro | Francesco Caprio | Pasquale Salvemini | Antonio Di Bello
2.A4	COMPARATIVE STUDY OF MITOCHONDRIAL DENSITY IN THE PECTORAL MUSCLE OF GREEN SEA TURTLES (CHELONIA MYDAS) AND DIAMOND-BACKED TERRAPINS (MALACLEMYS TERRAPIN) ***Morgan L. Garrett** | Carolina Priester | Amanda S. Williard

2.A5	MYCOBACTERIUM TUBERCULOSIS INFECTION IN A FREE-RANGING GREEN TURTLE (CHELONIA MYDAS), BRAZIL **Daphne Wrobel Goldberg** | Marina Molinas Alcala | Daniela Farias da Nóbrega | Fabio Sellera | Solange Fonseca
2.A6	ASSESSING THE 30-YEAR TEMPORAL CHANGES IN HEAVY METALS IN THE NORTHWEST PACIFIC OCEAN BY ANALYZING SAMPLES FROM GREEN SEA TURTLES **Shohei Kobayashi** | Yuto Sakazume | Yuki Oya | Takuya Fukuoka | Chiyo Kitayama | Satomi Kondo | Kaoruko Mizukawa | Hideshige Takada | Tetsuya Furuya | Gen Watanabe | Maricar Sison Prudente | Socorro Echevarria Aguja | Izumi Watanabe
2.A7	MYSTERIES OF A MEDITERRANEAN LOGGERHEAD: A CASE STUDY ACCUSING HUMANS OF PLASTIC POLLUTION ***Josie Lawrence** | Denise Cordeiro Soares | Daniela Freggi
2.A8	POST-MORTEM FINDINGS OF A PULMONARY BULLAE IN BUOYANT OLIVE RIDLEY TURTLES Claire Petros | **Minnie Liddell**
2.A9	PROGNOSTIC EVALUATION OF HEAD INJURIES IN 27 SEA TURTLES (CARETTA CARETTA) ***Serena Paci** | Stefano Ciccarelli | Antonio Di Bello | Adriana Trotta | Davide Bellomo | Delia Franchini
2.B1	STOWAWAYS – MARINE LEECHES INFECTING OLIVE RIDLEY SEA TURTLES ENTANGLED IN GHOST NETS Stephanie Köhnk | **Claire Petros** | Claire Lomas | Enas Mohamed Riyad | Shameel Ibrahim | Oliver Hawlitschek | Martin Stelfox
2.B2	GONADAL DYNAMICS OF FEMALE GREEN TURTLES (*Chelonia mydas*) NESTING AT TORTUGUERO NATIONAL PARK, CARIBBEAN COAST OF COSTA RICA, THE MOST IMPORTANT NESTING BEACH IN THE ATLANTIC BASIN ***Renato Saragoça Bruno** | Alan B. Bolten | Karen A. Bjorndal
2.B3	HOW STRONG ARE SEA TURTLE SHELLS? ***Ivana Serra** | Jeanette Wyneken

IN-WATER BIOLOGY

2.B4	USING FORENSIC ANALYSIS OF BITE-RELATED INJURIES ON SEA TURTLES TO DETERMINE SPECIES AND SIZE OF SHARK PREDATORS ***Derek M. Aoki** | Justin R. Perrault | Sarah L. Hoffmann | Jeffrey R. Guertin | Annie Page-Karjian | Brian A. Stacy | Dayv Lowry
2.B5	ACOUSTIC TELEMETRY ENABLES ANALYSIS OF POST-NESTING MOVEMENT PATTERNS OF NORTHWEST ATLANTIC LEATHERBACK SEA TURTLES (DERMOCHELYS CORIACEA) ***Derek M. Aoki** | Annie Page-Karjian | Justin R. Perrault | Jeffrey R. Guertin | George L. Shillinger
2.B6	PHTHALATE ESTERS (PAES) CONCENTRATION PATTERN REFLECTS DIETARY HABITATS (Δ13C) IN BLOOD OF MEDITERRANEAN LOGGERHEAD TURTLES (CARETTA CARETTA) ***†Monica Francesca Blasi** | Pasquale Avino | Ivan Notardonato | Cristina Di Fiore | Marco Friedrich Walter Gauger | Daniela Mattei | Michelle Gelippi | Davide Cicala | Sandra Hochscheid | Andrea Camedda | Giuseppe Andrea de Lucia | Gabriele Favero

2.B7	POLYMER COMPOSITION ANALYSIS OF PLASTIC DEBRIS INGESTED BY LOGGERHEAD TURTLES (CARETTA CARETTA) IN SOUTHERN TYRRHENIAN SEA THROUGH ATR-FTIR SPECTROSCOPY **Chiara Anastasia Bruno** | Monica Francesca Blasi | Daniela Mattei | Lorenzo Martellone | Serena Savoca | Gabriele Favero
2.B8	SPECIES IDENTIFICATIONS AND ANCIENT FORAGING HABITAT USE FROM FRAGMENTED MID-HOLOCENE MEDITERRANEAN SEA TURTLE REMAINS ***Willemien de Kock** | Meaghan Mackie | Max Ramsøe | Morten E. Allentoft | Annette C. Broderick | Julia C. Haywood | Brendan J. Godley | Robin T. E. Snape | Phil J. Bradshaw | Matthew von Tersch | Michael W. Dee | Per J. Palsbøll | Alberto Taurozzi | Michelle Alexander | Canan Çakirlar
2.B9	USING SATELLITE TELEMETRY TO IDENTIFY FORAGING GROUNDS OF LOGGERHEAD SEA TURTLES (CARETTA CARETTA) FROM SANIBEL ISLAND FL, USA **Andrew Glinsky** | Kelly Sloan | Jack Brzoza | David Addison
2.C1	A MECHANISM FOR COMPENSATORY GROWTH IN CARIBBEAN SEAGRASS MEADOWS GRAZED BY GREEN TURTLES ***Alexandra G Gulick** | Robert A Johnson | Clayton G Pollock | Zandy Hillis-Starr | Alan B Bolten | Karen A Bjorndal
2.C2	DIVING ACTIVITY OF OCEANIC-STAGE LOGGERHEAD SEA TURTLES USING TRI-AXIAL ACCELEROMETER DATA LOGGERS **Andrea Herguedas** | Rui Prieto | Hugo Parra | Joana Batalha | Ana Mafalda Sousa | Françoise Lima | Frederic Vandeperre
2.C3	HABITAT USE OF NORTHWEST ATLANTIC LEATHERBACK SEA TURTLE **Nina I. Mauney** | Kelly R. Stewart | Claudia D. Lombard
2.C4	POST-NESTING MIGRATIONS OF GREEN TURTLES (CHELONIA MYDAS) AT CAYO LARGO, CUBA **Felix Guillermo Moncada Gavilan** | Gonzalo Nodarse | Leonardo Valido | Cynthia Lagueux | Michel Hernández | Mayra Delgado | Anyell Caderno
2.C5	TRACKING POST-RELEASE MOVEMENT PATTERNS IN NEW YORK'S REHABILITATED COLD STUNNED SEA TURTLES **Maxine Montello** | Wendy McFarlane
2.C6	IN-WATER COMPUTER AIDED PHOTO-ID OF JUVENILE GREEN TURTLES (CHELONIA MYDAS) USING AFFINE TRANSFORMED FLIPPER SCALE PATTERNS **Kevin Pursley**
2.C7	GETTING THE MOST FROM SATELLITE TRACKING DATA: WHY TAGS FAIL, TAGGING SITE BIASES AND MAXIMISING DAILY LOCATIONS **Alex Rattray** | Nicole Esteban | Jaques-Olivier Laloë | Taka Shimada | Graeme C. Hays
2.C8	JELLYFISH FOR DINNER? STABLE ISOTOPES REVEAL TEMPORAL TRENDS IN THE TROPHIC NICHE OF OCEANIC LOGGERHEAD TURTLES IN THE MEDITERRANEAN ***Jessica Marie Ruff** | Gloria Fernandez | Luis Cardona
2.C9	THE PRESENCE AND DISTRIBUTION OF CARETTA CARETTA IN AND AROUND THE MPA VENTOTENE AND S. STEFANO, WESTERN MEDITERRANEAN SEA **Gianluca Treglia** | Antonio Romano | Fulvio Maffucci | Annarita Matrone | Eugenia Pasanisi | Sandra Hochscheid

2.D1	SPATIAL ECOLOGY OF THE HAWKSBILL SEA TURTLE IN AN UPWELLING REGION FROM THE EASTERN TROPICAL PACIFIC ***Veronica Valverde-Cantillo** | Maike Heidemeyer | Chris Lowe | Frank Paladino | Mario Espinoza
2.D2	ORIGIN OF GREEN (CHELONIA MYDAS) AND LOGGERHEAD (CARETTA CARETTA) TURTLES FORAGING IN KUŞADASI BAY, TURKEY ***Helena Vela Garcia** | Sezgin Karaman | Bahattin Sürücü | Marta Pascual | Oguz Turkozan | Carlos Carreras
2.D3	MASS STRANDING OF OVERWINTERING JUVENILE GREEN TURTLES (CHELONIA MYDAS) IN SOUTHERN BRAZIL AND URUGUAY (31° - 34° S) **Gabriela Manuela Velez-Rubio** | Marina Belen Reyes | Andrine Paiva da Silva | Sergio Estima | Danielle Monteiro | Fabrizio Scarabino | Alejandro Fallabrino
2.D4	TRIALLING THE USE OF AN UNMANNED AERIAL VEHICLE AND VHF TECHNOLOGY TO TRACK HATCHLING SEA TURTLES **Paul Abraham Whittock** | Peter Michael | Julian Kalau | Adam Mitchell
2.D5	SHOULD I STAY OR SHOULD I GO? MOVEMENTS OF SEA TURTLES DURING EXTREME WEATHER EVENTS **Natalie Elizabeth Wildermann** | Chloe Dannenfelser | Kimber De Salvo-Anderson | James Helms | Nicole Long | Pamela T. Plotkin

POSTER ROOM 3

*Denotes Archie Carr best student paper award candidate; † Denotes Grassroots paper award candidate; Presenting author in **BOLD**

FISHERIES & THREATS

3.A1	FORAGING GROUNDS OF YOUNG CHELONIA MYDAS AND THE INTERACTION WITH MULLET (MUGIL SPP.) FISHING IN THE RIGHT WHALE ENVIRONMENTAL PROTECTION AREA ("ÁREA DE PROTEÇÃO AMBIENTAL DA BALEIA FRANCA"), SOUTHERN COAST OF BRAZIL **Deisi Cristiane Balensiefer** | Gustavo Martinez-Souza | Laura Bonavigo | Andresa Capri | Thayana Gião | Gonzalo Velasco
3.A2	ANALYSIS OF DIGESTIVE TRACT CONTENTS FROM LOGGERHEAD SEA TURTLES CARETTA CARETTA (LINNAEUS, 1758) STRANDED ALONG THE NORTHWEST COAST OF MOROCCO **Wafae Benhardouze** | Mustapha Aksissou | Manjula Tiwari
3.A3	IDENTIFICATION OF RISK AREAS OF SEA TURTLE POACHING ON THE ISLAND OF BOA VISTA, CAPE VERDE, USING A STATISTICAL AND GIS-BASED APPROACH **Stephanie Butera** | Airton Jesus | Maria Medina Suarez | Thomas Reischig
3.A4	MONITORING OF MARINE DEBRIS INGESTION IN ALIVE LOGGERHEAD SEA TURTLES FROM TUNISIAN WATERS (CENTRAL MEDITERRANEAN) **Olfa Chaieb** | Kaouthar Maatouk | Mohamed Nejmeddine Bradai

3.A5	SEA TURTLE INTERACTIONS WITH THE ARTISANAL FISHERIES IN BELYOUNECH (STRAIT OF GIBRALTAR) ***Mohamed Rida Derdabi** | Mustapha Aksissou
3.A6	PERSISTENT ORGANIC POLLUTANT IN THE EGGS OF LEPIDOCHELYS OLIVACEA IN BRAZIL **Luciana Saraiva Filippos** | Satie Taniguchi | Rosalinda Carmela Montone
3.A7	BYCATCH OF SEA TURTLE ***†Fatima Zahra Hamiche**
3.A8	FACTORS AFFECTING MARINE DEBRIS INGESTION BY LOGGERHEAD TURTLES (CARETTA CARETTA) IN THE WESTERN MEDITERRANEAN ***Mar Izquierdo** | Francesc Domènech | Ohiana Revuelta | Jesús Tomás
3.A9	IDENTIFICATION OF ARGENTINE FISHING FLEETS OPERATING IN AREAS USED BY SEA TURTLES IN THE SOUTHWESTERN ATLANTIC OCEAN **Sofia Jones** | Laura Prosdocimi | Jorge D. Williams
3.B1	FISHERIES INTERACTIONS WITH CRITICALLY ENDANGERED LEATHERBACK SEA TURTLES IN THE CALIFORNIA CURRENT LARGE MARINE ECOSYSTEM: WHAT IS THE IMPACT AND HOW IS IT MEASURED? **Catherine Kilduff**
3.B2	ANALYSIS OF DIFFERENCES IN THE CHARACTERISTICS OF WATERCRAFT INJURIES AMONG THREE SPECIES OF SEA TURTLES **Amber Lea D. Kincaid** | Jake A. Lasala | Gretchen N. Lovewell | Jessica L. Blackburn | Brian A. Stacy
3.B3	REPORTING SEVERE DEGRADATION OF NESTING BEACH DUE TO EXTENSIVE SAND MINING THREATENING THE NESTING OF OLIVE RIDLEY AND GREEN SEA TURTLE IN GUJARAT, THE WEST COAST OF INDIA ***Sumedha Korgaonkar** | Kuppusamy Sivakumar
3.B4	EFFECTS OF GEAR MODIFICATIONS ON SEA TURTLE BY-CATCH CARETTA CARETTA (LINNAEUS, 1758): A MULTI-YEAR EXPERIMENT IN THE SURFACE LONGLINE FISHERIES OF THE AZORES **Françoise D. Lima** | Rita B. Alves | Hugo Parra | Miguel Machete | Marco Santos | Karen A. Bjorndal | Frederic Vandeperre | Alan B. Bolten
3.B5	HISTORICAL TRENDS IN NEW YORK STATE COLD STUNNED SEA TURTLE STRANDING-TO-RELEASE: 1998-2019 Maxine A. Montello | Katie D. Goulder | Robert P. Piscioitta | **Wendy J. McFarlane**
3.B6	A TWENTY-YEAR ANALYSIS OF MARINE LITTER INGESTED BY LIVE LOGGERHEAD SEA TURTLE, CARETTA CARETTA, FROM THE MEDITERRANEAN SEA **Chiara Roncari** | Antonino Pace | Andrea Affuso | Mariapia Ciampa | Fulvio Maffucci | Gianluca Treglia | Sandra Hochscheid
3.B7	GHOST GEAR ENTANGLEMENT ON LOGGERHEAD SEA TURTLES IN THE MEDITERRANEAN SEA **Neus Segura Alemany** | Ricardo Sagarminaga | Baptiste Mourre | Sergio Ruiz Halpern | David March

CONSERVATION, MANAGEMENT & POLICY

3.B8	MARINE TURTLE CONSERVATION IN CUBA: ACHIEVEMENTS AND CHALLENGES FACING PERSISTENT AND EMERGING THREATS **Julia Azanza Ricardo** | José L. Gerhartz Muro | Yanet Forneiro Martín-Viaña | Félix Moncada Gavilán | Fernando Bretos Trelles | Yosvani Medina Cruz | Gonzalo Nodarse Andreu | René Pérez Martín | Eddy García Alfonso
3.B9	SEA TURTLE CONSERVATION AND PARTICIPATORY MANAGEMENT AT THE BIJAGÓS ARCHIPELAGO, GUINEA-BISSAU: BENEFITS FOR LOCAL COMMUNITIES AND FOR THE SEA TURTLE CONSERVATION PROCESS **Castro Barbosa** | Justino Biai | Emanuel Dias | António Jesus Pires | Aissa Regalla | Quintino Tchantchalan
3.C1	TWO DECADES OF WORK CONSERVING SEA TURTLES ON THE PACIFIC COAST **Blanca Alicia Bojórquez Martínez**
3.C2	TOWARDS TRANSBOUNDARY MONITORING AND CONSERVATION OF MARINE TURTLE IN THE MEDITERRANEAN WITHIN THE MEDPAN NETWORK **Susan Gallon** | Reda Neveu | Dune Ganot | Laurent Sourbes | Marie Romani | Pierre Vignes | Purificacio Canals
3.C3	FROM LITTLE THINGS BIG THINGS GROW: LOCALISED SMALL-DRONE NESTING BEACH SURVEYS CAN SUPPORT A REGIONAL DATASET **Daniella Hanf** | Joshua Abbott | Sean Webb-Martin | Regina Flugge | James Gee
3.C4	LIVING IN COEXISTING: A NOVEL PREDATOR EXCLUSION CAGE DESIGN **Paul Hillbrand** | Seanna Jobe | Racheal Urbanek | Elizabeth Darrow
3.C5	COMMUNITY MONITORING, CONSERVATION & SECURING THE FUTURE OF FLATBACK TURTLES (NATATOR DEPRESSUS) IN PORT HEDLAND, WESTERN AUSTRALIA **†Kelly Ann Howlett**
3.C6	USING BAMBOO NEST COVERS TO PREVENT PREDATION ON SEA TURTLE EGGS **Emma Korein** | Alba Caballol | Pascall Lovell | Laura Exley | Carlos Porras Marin | Jose Carillo
3.C7	ANALYSIS OF THE SCIENTIFIC PRODUCTION ON SEA TURTLES IN CABO VERDE ***Gisela Marín-Capuz** | Javier Menéndez-Blázquez
3.C8	TURTLE LOVE: CONSERVING SEA TURTLES ON THE CARIBBEAN COAST OF COSTA RICA THROUGH COMMUNITY INVOLVEMENT, APPLIED RESEARCH, AND LIAISON WITH ENVIRONMENTAL AGENCIES †Renato Saragoça Bruno | **Gustavo Adolfo Ortiz Lopez** | Gilberto Rafael Borges Guzmán | Camille Fleury | Guilherme Lessa Ferreira | Melissa Msuo | Melissa Serrano | Braulio Piedra Leiton | Andrés Salas Chaverri | Daniele Macedo | Devon Valverde | Nerine Constant
3.C9	AN ASSESSMENT OF SEA TURTLE LIGHTING COMPLIANCE, ORDINANCE STRENGTH, AND DISORIENTATION IN PALM BEACH COUNTY, FLORIDA ***Emma Rimmer** | Teal Kawana | Kelly Cox
3.D1	ILLEGAL TAKE OF NESTING SEA TURTLES IN TORTUGUERO ROOKERY, COSTA RICA: CONSERVATION, TRADE, OR TRADITION?

	Daniela Rojas-Cañizales | Jaime Restrepo | Carmen Mejías-Balsalobre | Héctor Barrios-Garrido | Roldán A Valverde
3.D2	TRENDS AND NESTING PATTERNS OF CHELONIA MYDAS ON THREE BEACHES OF THE PASO DEL ISTMO BIOLOGICAL CORRIDOR, RIVAS, NICARAGUA: A REVIEW OF PASO PACÍFICO'S CONSERVATION PROGRAM OVER THE PAST DECADE **Osmar Benito Sandino** | Sarah Marie Otterstrom | Jairo Coronado | Julio Collado | Liessi Calero Jiménez | Darling Delgado Jiménez | Karen Lacayo Santana | Elena Yajaira Vargas Martinez | Yorlin Vargas Collado
3.D3	EFFECTIVENESS AND DESIGN OF MARINE PROTECTED AREAS FOR MIGRATORY SPECIES OF CONSERVATION CONCERN: A CASE STUDY OF POST-NESTING HAWKSBILL TURTLES IN BRAZIL ***Armando J B Santos** | Claudio Bellini | Erik A P Santos | Gilberto Sales | Renata Ramos | Daniel H. G. Vieira | Maria A Marcovaldi | Anthony Gillis | Natalie Wildermann | Morena Mills | Tiago Gandra | Mariana M P B Fuentes
3.D4	A NEW METHOD TO PREVENT SEA TURTLE NEST PREDATION BY WILDLIFE AND DOGS **Bárbara Sellés-Ríos** | Cristhian Jacinto Argandoña-Gutiérrez | Jorge García-Márquez
3.D5	UNOCCUPIED AIRCRAFT SYSTEM SURVEYS TARGET LEATHERBACK (DERMOCHELYS CORIACEA) CONSERVATION IN THE RIO DE LA PLATA ESTUARY, ARGENTINA **Natalia S. Teryda** | Laura Prosdocimi | Gabriela M. Velez-Rubio | Raymond R. Carthy
3.D6	THE MARRIAGE BETWEEN BASIC AND APPLIED SCIENCE ENHANCES SEA TURTLE CONSERVATION **Jeanette Wyneken** | Michael Salmon
3.D7	STRENGTHENING THE ROLES OF BEACH OWNERS IN MANAGING NESTING BEACHES AT THE JEEN WOMOM COASTAL PARK, PAPUA, INDONESIA **Kartika Zohar** | Abraham Leleran | Sinus Keroman | Deasy Lontoh | Manjula Tiwari | Fitryanti Pakiding
3.D8	THE SEA TURTLE EXPLOITATION'S PARADOX: A ONE HEALTH PLEA **Claire Saladin** | Rebecca Regnery

POSTER ROOM 4

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NESTING BIOLOGY

4.A1	MODELING TEMPERATURE DYNAMICS IN A LARGE OLIVE RIDLEY BEACH HATCHERY: METABOLIC HEATING AND ESTIMATED SEX RATIOS **Alberto Abreu-Grobois** | Claudia Ethel Deras-Amaya | Daniel Rios Olmeda | Julio Cesar Gonzalez-Palacios | Marisol Amador Medina
4.A2	DO SMALL-BODIED NESTING GREEN TURTLES (CHELONIA MYDAS) POSSESS THE CAPABILITY TO PRODUCE LARGE REPRODUCTIVE OUTPUTS? ***Ahmad Afif Aiman Azmi** | Syamsyahidah Samsol | Mohd Uzair Rusli

4.A3	NESTING ACTIVITY AND REPRODUCTIVE OUTPUT OF LOGGERHEAD (CARETTA CARETTA) AND GREEN TURTLES (CHELONIA MYDAS) ALONG THE LEBANESE COAST, EASTERN MEDITERRANEAN SEA **Ali Badreddine** | Lobna Ben Nakhla | Marwen Abderrahim
4.A4	METHODOLOGICAL STRATEGIES TO MINIMIZE IMPACT AND BIAS OF ORIENTATION EXPERIMENTS IN HATCHLING LEATHERBACK (DERMOCHELYS CORIACEA), GREEN (CHELONIA MYDAS), AND HAWKSBILL (ERETMOCHELYS IMBRICATA) SEA TURTLES ***TriciaLyn Beamer** | Bethany Holtz | Courtney Parks | Gigi Hess | Scott McRobert
4.A5	SHADE MANAGEMENT: AN ALTERNATIVE TO MITIGATE THE EFFECT OF HIGH TEMPERATURES ON SEA TURTLE NESTS IN CUBA **Claudia Cabrera Guerra** | Julia Azanza Ricardo | Ryan Betancourt Ávila | Randy Calderón Peña | Fernando Bretos Trelles | Pedro Pérez Álvarez
4.A6	INCUBATION TEMPERATURES, HATCHING SUCCESS, EMERGENCE SUCCESS AND CONGENITAL ANOMALIES IN GREEN TURTLE NESTS FROM GUANAHACABIBES PENINSULA, CUBA ***†Randy Calderón Peña** | Julia Azanza | Ryan Betancourt
4.A7	THE PHYSIOLOGICAL EFFECTS OF SARGASSUM BEACH COVERAGE ON THREE SPECIES OF SEA TURTLE HATCHLINGS ***Abigail Marie Chaney** | Sarah Milton
4.A8	THE INFLUENCE OF NEST SITE SELECTION ON THE HATCHING SUCCESS OF GREEN TURTLE (CHELONIA MYDAS) NESTS LAID AT PLAYA TRES, CARIBBEAN OF COSTA RICA **Dorian Decamus** | Séréna Vidé | Gustavo Ortiz Lopez | Renato Saragoca Bruno
4.A9	COMPARISON OF BEACH HATCHERY AND BOX NURSERY METHODS EFFECT ON HATCHLINGS AT AN OLIVE RIDLEY BEACH: HATCHING SUCCESS, PHYSICAL FITNESS, MORPHOMETRICS AND CONGENITAL MALFORMATIONS **Maria Clara Figueredo** | Jose Bisbe-Ochoa | Elizabeth Whitman | Catherine E Heart | Alejandra Aguirre | Roxy Hernandez | Angel Tello Sahagun | Katherine Comer Santos
4.B1	GREEN TURTLE REPRODUCTIVE SUCCESS ON THE ISLAND OF MEIO, IN THE BIJAGÓS ARCHIPELAGO, GUINEA-BISSAU **Tumbulo Garcia Bamba** | Castro Barbosa | Aissa Regalla | Paulo Catry | Ana Rita Patrício
4.B2	RESILIENCE: NEST SUCCESS AFTER MID-INCUBATION DISTURBANCES **Paul Hillbrand** | Elizabeth Darrow
4.B3	SPATIO-TEMPORAL DIVERSITY OF NESTING BEACH ENVIRONMENT AND TEMPERATURE IN THE OGASAWARA GREEN TURTLE ROOKERY: IMPLICATIONS FOR HATCHLING SEX RATIOS **Satomi Kondo** | Yusuke Sugimoto | Shohei Kobayashi | Yoji Yamamoto | Carlos Augusto Strussmann
4.B4	POPULATION GENOMICS OF THE LOGGERHEAD TURTLE COLONISATION IN THE WESTERN MEDITERRANEAN ***†Astrid Luna-Ortiz** | Gisela Marín-Capuz | Anna Barbanti | Cinta Pegueroles | Marta Pascual | Carlos Carreras
4.B5	USING STABLE ISOTOPES AND SATELLITE TRACKING ON POST-NESTING GREEN TURTLES IN GUAM TO IDENTIFY FORAGING HOTSPOTS IN THE WESTERN PACIFIC

	Josefa M.B. Muñoz | Alexander R. Gaos | Summer L. Martin | Jeffrey A. Seminoff | Camryn D. Allen | Jessy R. Hapdei | Cristian M. Cayanan | Shaya Honarvar | Brian N. Popp | Brian W. Bowen
4.B6	DECREASED VIABILITY OF GREEN TURTLE (CHELONIA MYDAS) NESTS DUE TO SUN EXPOSURE AT PLAYA TRES, CARIBBEAN COAST OF COSTA RICA ***Mafalda Naia** | Rui Rebelo | Renato Saragoça Bruno | Mário Jorge Pereira
4.B7	GEOGRAPHIC DISTRIBUTION AND INFLUENCE OF RIVER MOUTHS ON THE NESTING ACTIVITY OF LEATHERBACK (DERMOCHELYS CORIACEA) AND GREEN TURTLES (CHELONIA MYDAS) AT PLAYA TRES, NORTH CARIBBEAN OF COSTA RICA **Gustavo Adolfo Ortiz Lopez** | Renato Saragoça Bruno | Braulio Piedra | Daniele Macedo | Amelia Richardson | Andrés Salas Chaverri | Bethany Johnson | Devon Valverde
4.B8	STRATEGIC NEST SITE SELECTION IN ONE OF THE WORLD'S LARGEST LOGGERHEAD TURTLE NESTING COLONIES, MAIO ISLAND, CABO VERDE **Juan Patino-Martinez** | Leno Dos Passos | Raquel Amador | Arnau Teixidor | Sergio Cardoso | Adolfo Marco | Franziska Koenen | Amanda Dutra | Christophe Eizaguirre | elisa Dierickx | Manjula Tiwari | Tamás Székely | Rocío Moreno
4.B9	PATHOLOGY OF LEATHERBACK (DERMOCHELYS CORIACEA) EMBRYOS AND DEAD IN NEST HATCHLINGS IN ST. CROIX, U.S. VIRGIN ISLANDS **Angela Storm Picknell** | Kimberly M. Stewart | Kelly Stewart | Michelle M. Dennis
4.C1	EVALUATION OF PUTATIVE HYBRID HATCHLINGS BETWEEN HAWKSBILL TURTLE (ERETMOCHELYS IMBRICATA) AND GREEN TURTLE (CHELONIA MYDAS) IN TORTUGUERO, COSTA RICA **Jaime Restrepo** | Jimena Gutiérrez-Línce | Roldan A. Valverde
4.C2	MOON PHASE AND NESTING ACTIVITY OF ENDANGERED GREEN TURTLES (CHELONIA MYDAS) DURING PEAK NESTING SEASON AT PLAYA TRES, CARIBBEAN OF COSTA RICA ***Amelia Richardson** | Gustavo Ortiz López | Renato Saragoça Bruno
4.C4	DEVELOPMENT OF SPECIFIC ENZYME-LINKED IMMUNOSORBENT ASSAY FOR DETERMINING FSH LEVELS IN THE GREEN TURTLE CHELONIA MYDAS, USING RECOMBINANT GONADOTROPINS ***Osher Ester Soffer** | Olga Rubin | Yaniv Levy | Joseph Aizen
4.C5	EXPERIMENTAL ANALYSIS OF WAVELENGTH PREFERENCES SHOWN BY HATCHLING LEATHERBACK SEA TURTLES (DERMOCHELYS CORIACEA) **Samantha Elizabeth Trail** | Michael Salmon
4.C6	CLUTCH SIZE AND DEPTH OF GREEN TURTLE (CHELONIA MYDAS) NESTS LAID AT PLAYA TRES, CARIBBEAN OF COSTA RICA, DO NOT VARY BASED ON NEST PROXIMITY TO TIDE LINE ***Séréna Vidé** | Dorian Decamus | Gustavo Ortiz Lopez | Renato Saragoça Bruno

SOCIAL, ECONOMIC & CULTURAL STUDIES

4.C7	ADDRESSING GAPS IN SOCIO-ECONOMIC AND NATURAL ASSETS TO HALT MARINE TURTLE EGG POACHING: A LIVELIHOOD FEASIBILITY STUDY IN THE TURTLE ISLANDS

	WILDLIFE SANCTUARY, PHILIPPINES **Cecilia Fischer** | Romeo B. Trono | Rizza Araceli F. Salinas
4.C8	REPRESENTATION OF TOURISM EXPERIENCES AT THE VELAS KASAV MAHOTSAV (TURTLE FESTIVAL), INDIA, ON MOBILE SOCIAL MEDIA ***Ankita Patil** | Andrea D. Phillott

ABOUT THE ISTS AWARDS

Nominations for awards are solicited from ISTS members several months prior to each symposium. Following the submission deadline, the nominations and associated letters of support are reviewed and scored by the elected members of the ISTS Career Awards Committee. The committee's recommendations are then reviewed by the ISTS Board of Directors, prior to selection of the awardees, who are announced at the end of the symposium. One additional career award, the President's Award is given at the discretion of the current ISTS President. All awards are described below:

ISTS Lifetime Achievement Award

The ISTS Lifetime Achievement Award honors an individual that has had a significant impact on sea turtle biology and conservation work through the course of their career.

ISTS Champions Award

The ISTS Champions Awards are presented to individuals, communities, or governmental or non-governmental organizations that have, in the recent past, carried out outstanding work towards the effective conservation of sea turtles.

ISTS Ed Drane Award for Volunteerism

The Ed Drane Award for Volunteerism was established in memory of Ed Drane, Treasurer of the ISTS for more than 20 years. His passion for the sea turtles and his commitment to the ISTS and its international mission were both energizing and inspiring. This award will be presented to an individual who is working with sea turtles outside of their professional life. They do not seek academic or monetary credit for their voluntary efforts, but they make a significant contribution to the study and conservation of sea turtles.

ISTS President's Award

An annual award, made by the President, to an individual or community, governmental or non-governmental organization that has made an outstanding achievement to further the mission of the ISTS.

ISTS Archie Carr Student Awards

The Archie Carr Student Award for the best student presentation is given annually at the International Sea Turtle Symposium in recognition of excellence in graduate student research. Awards are made for both oral and poster presentations, in the categories of biology and conservation. See here for a history of the Archie Carr Student Award and here for more information about Dr Archie Carr.

Grassroots Conservation Award

One award is given to a Symposium presentation (poster or oral) that best demonstrates a positive contribution by a grassroots group or individual towards the conservation of marine turtles and/or their habitats. Presentations are judged by 5 - 6 judges in a process similar to that undertaken for judging the Archie Carr Student Awards.

INTERNATIONAL SEA TURTLE SOCIETY

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27th Michael Coyne (2007, North Myrtle Beach, USA)
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29th Colin Limpus (2009, Brisbane, Australia)
30th Kartik Shanker (2010, Goa, India)
31st Jeffrey A. Seminoff (2011, San Diego, USA)
32nd Ana Rebeca Barragán (2012, Huatulco, Mexico)
33rd Ray Carthy (2013, Baltimore, USA)
34th Roland Valverde (2014, New Orleans, USA)
35th Yakup Kaska (2015, Dalaman, Mulga, Turkey)
36th Joanna Alfaro Shigueto (2016, Lima, Peru)
37th Frank Paladino (2017, Las Vegas, USA)
38th Yoshimasa Matsuzawa (2018, Kobe, Japan)
39th Kenneth J. Lohmann (2019, Charleston, USA)