出國報告(出國類別 ： 開會)

參與 2023 澳洲 APMBC 亞太海洋生物技術研討會-臺灣厚殼文蛤的初步探索

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派赴國家、城市:澳洲阿得雷德

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「參與 2023 澳洲 APMBC 亞太海洋生物技術研討會-臺灣厚殼文蛤的初步探索」

出國報告書

摘要

本次參加 2023 澳洲阿得雷德第十三屆亞太海洋生物技術研討會 APMBC(Asia-Pacific Marine Biotechnology Conference, APMBC)亞太海洋生物技術研討會和第 5 屆澳洲紐西蘭海洋生物技術協會 ANZMBS(Australia New Zealand Marine Biotechnology Society, ANZMBS)聯合舉辦，會議聚焦於當前亞太地區海洋生物技術研究和產業發展，故吸引全世界許多海洋生物技術專家、產業、投資者和政策制定者參與。此外這也是 APMBC 首次在澳洲/紐西蘭地區舉辦。透過結合紐澳和亞太地區，雙方擁有豐富的生物多樣性，藉此提升海洋生物技術產業成長和未來發展絕佳的機會。

與會臺灣成員來自國立臺灣大學、國立臺灣海洋大學、國立中山大學、國立成功大學、國立嘉義大學、國立宜蘭大學、國立屏東科技大學、國立高雄科技大學及農業部水產試驗所等研究機構。

本次報告主題包含海洋生物多樣性、水產品加工及萃取、水產養殖及漁業、糧食安全與藍色農業、藻類生物技術；永續發展的部分含生態系統及循環經濟、海洋真菌、海洋生物材料、遺傳育種等研究領域。筆者之海報發表關於文蛤育種分析初期階段探索，也藉由會議之交流互動，多方認識相關領域學者，啟發更多的研究想法，促進國際研究合作。

會議的主要目標是促進整個亞太地區的學術與產業夥伴建立合作關係，會議規劃的一個主要特點產學之平衡，故吸引學術和產業參與的熱烈討論。該計畫提供產業、投資和政策建議交流，作為政府產業合作制定發展政策優先考量業界潛力將本身的成果合作彼此交流，並透過學術及業界資訊的統合增進合作機會，帶給人類海洋糧食資源及漁業資源的多元永續發展，在未來持續突破科學及產業上的瓶頸。

目次

「參與 2023 澳洲 AMPAC 亞太海洋生物技術研討會」

出國報告書

壹、研習目的

此次參加由澳洲主辦 2023 亞洲太平洋海洋生物技術研討會，為促進海洋生物技術研究及相關跨領域科學與技術之發展合作及交流，臺灣海洋生物技術學會學員也共同出席，國內學者及學生來自於國立臺灣大學、國立臺灣海洋大學、國立中山大學、國立成功大學、國立嘉義大學、國立宜蘭大學、國立屏東科技大學、國立高雄科技大學及農業部水產試驗所等相關研究機構。
尤其這也是 APMBC 首次在澳洲/紐西蘭地區舉辦。透過結合澳洲、紐西蘭和亞太地區，彼此擁有豐富的生物多樣性，來提升海洋生物技術產業的成長和學術研究未來發展向前的機會。

會議會場在南澳阿得雷德市中心會議中心，位於阿得雷德河岸，由三座獨立建築物集成的組成：該建築利用其在托倫斯河上的黃金位置，提供充足的自然光和河流全景。阿得雷德國際機場距離阿得雷德會議中心僅 7 公里，搭乘計程車即可快速抵達，南澳為澳洲大型海鮮產業的發源地，由多個行業提供海洋生物技術服務，該產業不斷尋求產品的附加價值。

澳洲海鮮合作研究中心(Seafood CRC)於 2007 年至 2014 年間坐落阿得雷德，為南澳提供多個海鮮/水產養殖業的研究計畫資助，例如南方黑鮪、黃尾石首魚、沙丁魚、牡蠣和南方岩龍蝦。位於南澳海灘港的澳洲海帶產品公司 (AKP) 生產液體海帶肥料和海藻動物飼料。為了推動澳洲第三代高價值海洋生物產品產業的發展，由 70 多個產業和研究合作夥伴組成的澳洲國家級產業驅動研發聯盟已在 2021 年獲得大量公共和私人資金，以支持建立海洋生物產品合作研究中心(MBCRC)，澳洲國家工業驅動的研發旗艦，臺灣也可以依循澳洲的模式進行產業升級結合資金和研究。

本次筆者發表關於文蛤厚殼育種分析初期階段，藉由會議多方認識相關領域育種學者並進行交流，來激發更豐富多元的研究想法，增加國際間研究合作，瞭解有關水產繁養殖頂端技術的最新發展。由於近些年氣候變遷，導致氣候不穩定，因為強降雨養殖池水鹽度、溫度、酸鹼值等多項變化，造成貝類大量死亡，透過不同水產物種的育種模式，選種及 SNP，篩選規劃如何在未來建立更好更快速精確的遺傳育種模式，大幅降地傳統表觀遺傳的困境，利用分子生物學及次世代定序 NGS，快速挑選耐極端氣候變化的優質品系，提高國家糧食安全及業界種苗的未來方案，期許臺灣未來貝類養殖及研究上更加精實。

貳、研習內容

一 行程

本次赴澳洲阿得雷德亞太海洋生技研討會

時間	地點	內容
9 月 30 日至 10 月 1 日	桃園國際機場 澳洲雪梨轉機 澳洲阿得雷德機場	由桃園搭乘華航到澳洲雪梨轉機至阿得雷德機場。
10 月 2 日	澳洲阿得雷德會議中心	會議第一天 開幕報到貼海報
10 月 3 日	澳洲阿得雷德會議中心	會議第二天 三項主題演講 1.海洋生物多樣性與資源 2.水產品加工及萃取 3.水產養殖與漁業
10 月 4 日	澳洲阿得雷德會議中心	會議第三天 上午場次主題演講 1.糧食安全與藍色農業 2.藻類生物技術 3.永續發展 中午/下午場次 1.海洋生物運用醫學 2.海洋組學 3.海洋毒素 最後場次 海洋生物技術女性領導力論壇

時間	地點	內容
10 月 5 日	澳洲阿得雷德會議中心	會議第四天 上午場次主題演講 1.海洋真菌產品 2.藻類生物技術 3.海洋生物材料 中午/下午場次 1.海洋生物多樣性 2.南澳研究與發表研究所 3.水產養殖與漁業 下午場次 1.永續發展:氣候變遷與碳封存 2.投資論壇 3.水產養殖與漁業
10 月 6 日	澳洲阿得雷德會議中心	會議第五天 三項主題演講 1.海洋生物材料 2.藻類生物技術 3.糧食安全與藍碳 頒獎海報及口頭發表獎項 閉幕儀式
10 月 8 日至 10 月 9 日	澳洲阿得雷德機場 澳洲墨爾本轉機 桃園國際機場	由澳洲阿得雷德機場到墨爾本轉機回到桃園國際機場。

二、內容演講育種重點

鮑魚育種
演講題目:「綠色太平洋雜交鮑魚」(*Haliotis discus hannai* Female X *H.fulgens* Male) 生長性狀的全基因組關聯研究-中國福建農林大學
演講者: Zipping Zhang

主要討論了中國福建地區鮑魚養殖、育種、以及未來如何挑選快速成長的鮑魚
方法:
中國養殖鮑魚來自墨西哥、澳洲、紐西蘭分為 1.太平洋鮑魚-皺紋盤鮑 2.青邊鮑魚 *H.laevigata* 3.綠鮑魚 *H.fulgens*
生長速度是鮑魚養殖最重要的特性之一，雜交提高某些特徵（例如生長速度）。
常見的雜交兩種品種為
1. 虎鮑魚 (*H.rubra* X *H. laevigata*)
2. 綠太平洋鮑魚 (*H.discus hannai* X *H. fulgens*)
養殖性狀的雜交種活力已在種間鮑中廣泛觀察到與親代相比，虎鮑和綠太平洋鮑的生長速度較快。雜交種生長性狀占主導地位的分子機制尚不清楚—哪些基因或 SNP 可能有助於更快的生長？而全基因組關聯研究 (GWAS) 是特徵分析的強大分析工具。
方法流程為；定序基因分型 1.SNP 的鑑定 2.GWAS（LMM 和 FarmCPU）3.生長性狀相關的 SNP 和基因 4.透過檢查候選 SNP 和基因的表達來驗證。
生長表型性狀用總重、殼重、足肌重、軟體重；以及殼長、殼寬、殼高，並將生長性狀的表型數據整理皮爾森積動差相關係數熱圖測量的雜交鮑魚生長性狀顯示出顯著的正相關性，表明這些性狀的協調調節。

定序資料的品質控制選出 30 個最常出現的 SNPS 數量的分佈 1. 以基因分型鑑定出 745,304 個 SNP 和 96,271 個 INDELs 2. 521,802 個 SNP 透過後續關聯分析的品質控制。並且用生長性狀 GWAS(LMM) 結果製成曼哈頓圖，最後找到 27 SNPS 主要位於基因內含子、基因間區域和上游基因變異，顯示與生長性狀有顯著相關。

總結生長性狀的全基因組關聯分析能夠透過 2 個不同的模型識別多個生長潛力/顯著/關聯極顯著的關聯位點。而上述的 27 個 SNP 可以作為輔助育種的候選分子標記，透過增加後代顯性等位基因的頻率可以實現優良生長性狀的穩定遺傳。表達模式分析證實這些基因座可能透過改變生長相關基因的表達來影響生長性狀。

研究觀察到雜交所得的混合品種，如虎鮑和綠太平洋鮑魚，比純種品種生長速

度更快，顯示雜交種活力在鮑魚中具有重要作用。然而，雜交種活力的分子機制仍不清楚，尚未確定哪些基因或 SNP 對更快的生長有貢獻。全基因組關聯研究（GWAS）被應用於分析這些性狀。

實驗採用了 SNP 分型鑑定，進行了 GWAS 分析，找到了與生長性狀顯著相關的 SNP 和基因。 這些關聯位點主要位於基因內含子、基因間區域和上游基因變異，進一步證明了它們與生長性狀的顯著相關性。透過這項研究，確定了 27 個 SNP，它們可作為候選分子標記用於輔助育種，透過增加後代顯性等位基因的頻率來實現良好生長性狀的穩定遺傳。同時，表現模式分析也證實了這些基因位點可能透過改變與生長相關的基因的表達來影響生長性狀。

最後透過全基因組關聯分析，鑑定出多個與鮑魚生長性狀相關的關聯位點，提供了有力的遺傳信息，有望幫助改進鮑魚的育種方法，加速培育具有更快生長速度的鮑魚品種，為鮑魚養殖業的永續發展提供了重要的基礎。

牡蠣育種
演講題目: 福建沿海福建牡蠣遺傳多樣性-中國集美大學
演講者 Huayong Que

中國福建牡蠣養殖最大宗為葡萄牙牡蠣，第二為熊本牡蠣、第三香港牡蠣、最後為近江牡蠣。並且中國集美大學在 2021-2023 年間收集了 19 處野生牡蠣及養殖場採樣數據庫。建構野生及養殖牡蠣基因庫，並分析從福建沿海採樣回來的牡蠣外表型態，基於現場調查取樣,結合採用多種特異性 PCR(multiplex species-specific PCR)、ITS2 雜交種鑑定和 COI 定序共同鑑定福建沿海巨牡蠣(Crassostrea)種類及其分佈情況，並找到 600bp 上位點進一步分析，用此方法分析出 3 種巨牡蠣沿中國東南海岸線分佈。

1. 18 個地點發現了 607 個 葡萄牙牡蠣 *Crassostrea. angulata* (63.23%)
2. 17 個地點發現了 343 個 熊本牡蠣 *Crassostrea. sikamea* (35.73%)
3. 10 個香港牡蠣 *Magallana hongkongensis* (1.04%) 在 1 個地點發現。

葡萄牙牡蠣 *Crassostrea. angulata* 的歷史
葡萄牙牡蠣，長期以來被認為原產於大西洋，是歐洲養殖的主要雙殼類物種，直到 20 世紀 70 年代，大規模的北方牡蠣導致它現在只存在於少數地區，如:歐洲地區。
葡萄牙牡蠣在中國的廣泛分佈和高度的基因多樣性顯示葡萄牙牡蠣是從中國轉移而來的，然而，歐洲東部和福建牡蠣的基因數，目前葡萄牙牡蠣主要分佈在中國南部、越南和日本。其中中國東南部地區是葡萄牙牡犡的主要分佈和繁殖區，每年都有一批卵從福建運往中國其他地區和越南。

考慮到近 20 年來福建主要海灣進行了高強度的牡蠣養殖，有必要了解福建沿海地區野生牡蠣族群的物種組成和數量比例等自然遺傳資源情況。
這些研究結果揭示了福建沿海地區巨牡蠣屬的物種組成和分佈情況，為進行牡蠣的遺傳多樣性分析、遺傳分化等種群遺傳研究提供了關鍵基礎資料,為牡蠣遺傳資源的保護和利用奠定重要基礎。

特別是對於葡萄牙牡蠣的歷史，研究揭示了其在中國的廣泛分佈和高度的基因多樣性，這暗示著葡萄牙牡蠣可能源自中國並在其他地區傳播。考慮到近 20 年來福建地區進行了高強度的牡蠣養殖，這項研究結果提供了有關福建沿海地區巨牡蠣屬物種組成和分佈的重要資訊，為進一步的牡蠣遺傳多樣性研究和資源保護提供了基礎。這將有助於更好地管理和利用牡蠣的遺傳資源，同時也為減少環境污染對牡蠣養殖造成的潛在經濟損失提供了重要的依據。

魚類育種

1．大黃魚多基因組選拔研究

演講題目:大黃魚多性狀綜合基因組選拔-集美大學；演講者: Ming Fang

大黃魚是中國產量最大的海水魚種之一，近年來開始研發鑑定生長及抗病的遺傳特性及性狀相關分子標記、致病基因方面取得了重要的突破。

抗病育種及生長育種可以縮短養殖週期，並透過無添加魚粉的飼料來解決魚粉短缺問題。

大黃魚常見疾病及出現月份

1．體表潰爛:3-5 月

2．寄生蟲及皮膚白斑:5-7 月

3．內臟因寄生蟲造成的白斑:4-5 月

4．細菌性引起白鰓:6-9 月

並將所蒐集的樣本進行基因組選拔，透過全基因組分型、表型分析、親緣關係，和內臟白斑症抗病育種標記選拔，以 MassArray 進行基因分型依據 GEBV，選出雌魚 31 條，雄魚 22 條，以上這 53 條是由 665 隻挑選出。

預期可挑選成長快及抗病的品種進行擴大培育,改善因環境汙染造成大黃魚減量的經濟損失，並增加糧食穩定。

大黃魚常見的疾病和其出現月份已經被確認,這對於早期預防和治療具有重要的指導意義。此外,透過採集樣本並進行基因組選拔,全基因組分型以及表型分析,成功選拔出表型和親緣關係,以及對內臟白斑症的抗病育種標記選拔,這些都有助於提高大黃魚的養殖品質。

未來,希望能夠更快速地選拔具有生長迅速和抗病性的品種,以擴大其養殖規模。這將有助於改善因環境污染導致的大黃魚減產所帶來的經濟損失,並增加食品供應的穩定性。這些研究對於中國的漁業和養殖業有著正面的影響，為產業的永續發展提供了強大的支持。

2．魚類基因組編輯育種現況及展望
演講題目:魚類基因組編輯育種現況與展望-中國黃海水產研究所
演講者:陳松林

日本牙鮮、中華舌鰨和比目魚等魚類的遺傳基礎以及研究方法。 以下是演講的重點：
1．日本牙鮮抗病性遺傳基礎：
日本牙鮮對遲緩愛德華氏菌抗性是多基因性狀，還找不到主要效應基因。
基於使用全基因組數據、高密度 SNP 連鎖圖譜、QTL 精細定位、蛋白質體學和 GWAS 分析進行研究。
2．中華舌鰨抗病性遺傳基礎：
中華舌鰨對弧菌症的抗性也是多基因性狀，缺乏主要效應基因。
透過 GWAS 和轉錄組分析證實抗性是多基因的，且具有微效應。
發現了雌性特異性分子標記，可以協助性別鑑定。
3．性別連鎖標記：
使用 AFLP 和微衛星（SSR）標記可以識別魚類的性別。
偽造雄性個體的後代中，約 95%是雄性。
4．基因組編輯技術：
建立了基因組編輯平台，使用 TALEN 技術剔除 dmrt1 基因，以改善中華舌鰨的生長速度。
5．基因組選擇技術：
建立參考族群，篩選出抗病和易感染家系，進行基因組重定序，並估計 SNP 和 GEBV 的遺傳效應。

這些研究結論表明，日本牙鮮和中華舌鰨的抗性特徵是多基因性狀，沒有明確的主要效應基因。 研究採用了全基因組數據、高密度 SNP 連鎖圖譜、QTL 精細定位、蛋白質體學和 GWAS 分析等多種方法來深入研究這些抗性特徵的遺傳基礎。 開發了日本牙鮮的 SNP 陣列，提高了遺傳選拔的精確度。

此外，研究中還發現了與性別相關的分子標記，可用於性別鑑定，以及利用基因組編輯技術改善中華舌鰨的生長速度。並開發中國首個用於魚類抗病育種的 SNP 晶片「育新 1 號」（50K）。與傳統 BLUP 相比，預測精度提高了 20%。

上述透過建立參照群體和 SNP 數組，提高了魚抗病育種的遺傳選拔效率，為相關產業的發展提供了新的工具和方法。 這些研究結果對魚類養殖業和遺傳改良領域有重要的理論和實際價值。

餌料生物-微藻
演講題目:微藻生物技術的宣傳、希望與未來之路-荷蘭瓦赫寧根大學
演講者: Maria Barbosa

探討微藻在促進糧食安全和應對環境挑戰方面的重要性，以及其在生物技術領域的潛力。
以下為重要資訊：
1.利用陽光、肥料、糖、CO_2 和海水生長，具有生產蛋白質和脂質的潛力，從而促進糧食安全。
2.作食品、飼料、能源和化學品的原料，具有高面積生產率和 100%的肥料利用率。
3.取代大豆蛋白、魚油和棕櫚油，並在現代工業生物技術中用作細胞工廠來生產設計飼料、重組蛋白、生物製藥和疫苗的潛力。
德國在二戰期間首次嘗試工業化利用微藻作為潛在的主要食物來源，但第一波微藻生產發展在綠色革命中受到阻礙。
4. 用於人類保健食品和水產養殖飼料的市場在 1990 年代發展，在石油高峰時期和原油價格上漲時，生物燃料推動了微藻生產的興趣。目前，微藻生產公司已轉向永續蛋白質來源和食品成分，導致該領域的技術發展和生產設施規模擴大。儘管微藻食品補充劑和水產養殖市場有所成長，但全球市場總量仍相對較小。
5. 用於生產富含蛋白質的食品或飼料補充劑，即「單細胞蛋白」(SCP)，但目前的生產規模仍然較小。
微藻有不同的養分模式，包括光養和混合養，光是光養和混合養培養的重要基質。微藻作為生產蛋白質治療藥物的潛在細胞工廠備受關注，但工業規模生產尚未實現。
6.商業化生產面臨規模經濟問題，但它具有高土地利用效率，特別是與其他微生物 SCP 來源相比。

講者強調了微藻在永續食品生產和生物技術領域的重要性具有巨大的潛力，以應對人口成長和環境挑戰。儘管存在一些挑戰，例如規模化生產問題，微藻作為一種永續資源，為未來的永續發展提供了希望。

水產動物遺傳育種的現況與未來展望

近年來，全球的魚類和貝類養殖業經歷了巨大的進步，這些進展借助基因組資訊和基因型與表型之間的關聯，開展了遺傳連鎖圖譜、微陣列、單核苷酸多態性（SNP）陣列、標記/因果突變輔助選擇、轉錄組資料庫以及基因組參考序列等各領域的研究。得益於 CRISPR 技術的突破，使得基因組編輯成為現實。

水產養殖動物遺傳育種的關鍵經濟特性包括抗病性、飼料轉換率、生長速度、行為、繁殖特性以及對環境壓力的耐受性，如低溶氧、高溫或低溫、鹽度、體內成分和肉質。透過遺傳分子標記的快速選擇、精確控制變異位點和基因編輯，未來將更快改善經濟產量，從而推動水產動物養殖業的發展。

傳統上，商業水產養殖行業的遺傳改良依賴於表型和家系信息，但最近領先的國際養殖公司已經開始在育種計劃中應用基因組技術，尤其是在擁有先進基因組資源和工具的物種中。

基因組資訊為加強生理研究提供了強大的工具，其結果可用於改善養殖和飼料配方、育種技術以及遺傳選擇或篩選，例如表觀遺傳學、蛋白質組學和代謝組學。如今，許多水產養殖物種都已擁有各種組裝狀態的全基因組序列，可以識別基因組變異，如 SNP。然而，這些資訊僅在預測對生產或產品品質有正面影響的表型時才有用。因此，遺傳圖譜、數量性狀位點（QTL）分析、全基因組關聯研究（GWAS）、基因表達譜和生物資訊分析可用於鑑定與特定表型性狀相關的基因型變異，然後可以在育種計劃中加以利用。 對於一些水產養殖物種，我們已經實現了基於基因組的技術，如標記輔助和全基因組選拔，這些技術可以用於增強水產養殖性狀，研究開始關注功能性狀和商業重要性狀背後的基因調控網絡。更全面地了解生長、繁殖和抗病性背後的基因網絡將為水產養殖業開發更強大、更具生產力的遺傳群體提供知識庫。

以上文中，我們回顧了基因組工具的發展以及基因組技術在水產養殖物種遺傳改良的應用。具體而言，我們審視了基因組圖譜和定序的現狀，確定了我們目前知識的差距，並強調了在水產養殖領域實施新技術的緊迫性以及一系列重要任務。

參、研習心得及建議

參加 2023 澳洲阿得雷德第十三屆 AMPAC(Asia-Pacific Marine Biotechnology Conference, APMBC)亞太海洋生物技術研討會，這次經驗不僅讓我深入了解當前海洋生物技術及育種這些領域的最新發展，也為我打開了國際交流和新思維的大門。

一、海洋生物技術：擁抱未來的潛力
探討了不同的海洋生物資源，包括微藻、藻類、海洋生物多樣性，以及如何應用生物技術來保護這些資源和開發新的應用。學習如何運用基因編輯技術改進海洋生物的耐受性，以及生產高品質的海洋生物產品。最重要的是，我們看到了這些技術對於環境和糧食供應產生積極影響，並持續發展提供了新的可能性。
二、水產遺傳育種：挑戰與機遇
討論了水產遺傳育種，這是確保水產養殖行業長期可持續發展的一個關鍵方面。深入探究了不同水生產養殖物種類的育種方法，包括遺傳改進和選拔。說明育種對品種改進和抗病性的重要性，以及如何避免對自然環境的不良影響。這部分提醒水產養殖行業必須與生態保護和可持續性保持平衡。
三、國際間交流：激發新想法
這次研討會的一個關鍵亮點是來自世界各地的專家和與會者的交流。我們參加了研討會期間的小組討論，交換了意見，分享研究成果，這些互動為我們提供了許多新想法。不同國家背景的參與者帶來了多元化的觀點，激發了跨文化交流，這有助於我們更好地理解全球海洋生物技術和水產養殖遺傳育種的挑戰和機會。
四、跨國交流：共同實現目標
強調了跨國交流的重要性，特別是在解決全球性挑戰時。我們看到了不同國家機構和研究團隊之間的成功案例，如何共同合作來推動創新和可持續性。通過演講交流意見，我們可以集結各種資源，解決複雜的問題，並實現更大的影響。這次研討會為我們提供了建立跨國交流的平臺，為未來的項目奠定了基礎，可以作為國內研究單位及業界參考。

經過這次研討會的寶貴經驗。使我明白我們不僅深入了解了海洋生物技術和水產養殖遺傳育種的最新趨勢，還建立了寶貴的國際人際網絡， 通過不同國家學術及業界單位共同研習，我們能充分發揮這一領域的潛力，共同實現可持續性和保護我們的海洋環境。期待著將這些經驗應用於未來的項目，提升科學研究的進步，為世界海洋生物及能源、糧食安全做出更大貢獻。

肆、研習照片

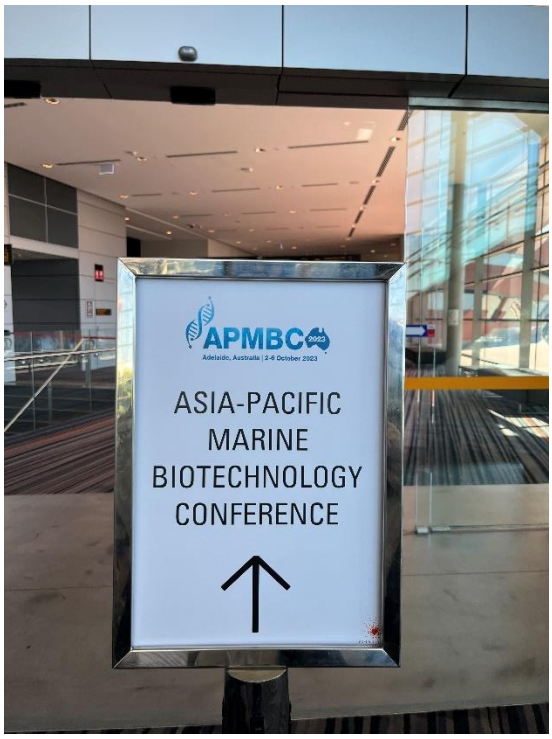


圖 1、會場指示圖

圖 2、臺灣區水產養殖及海洋生物科技學會學者及學生合照

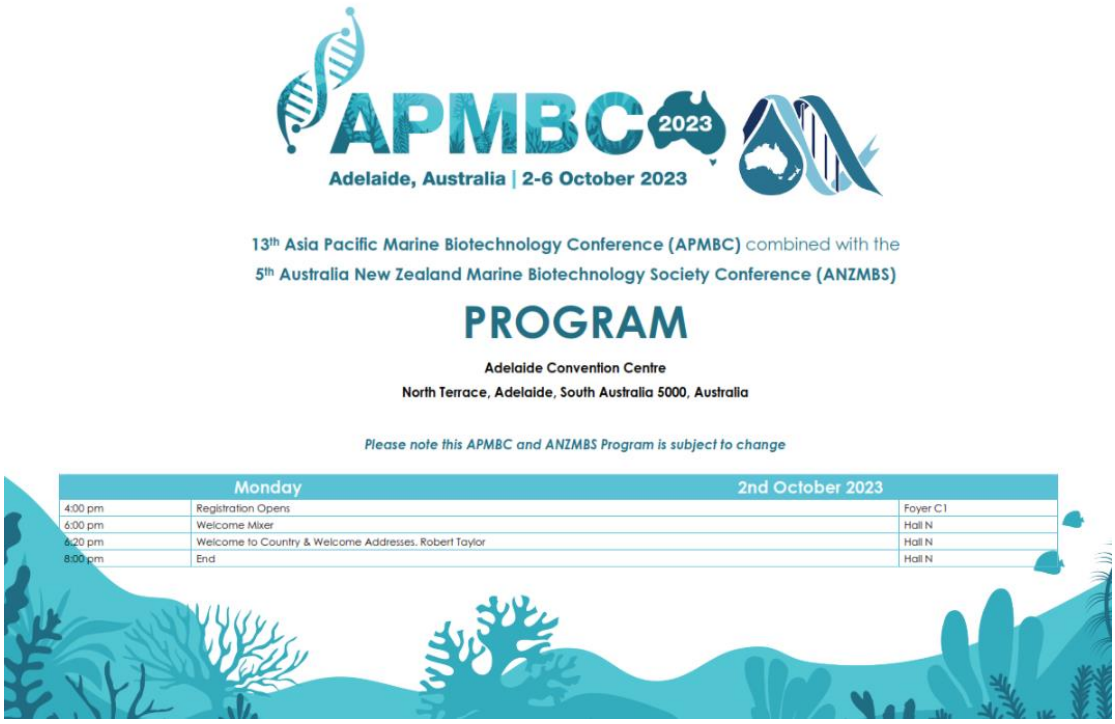
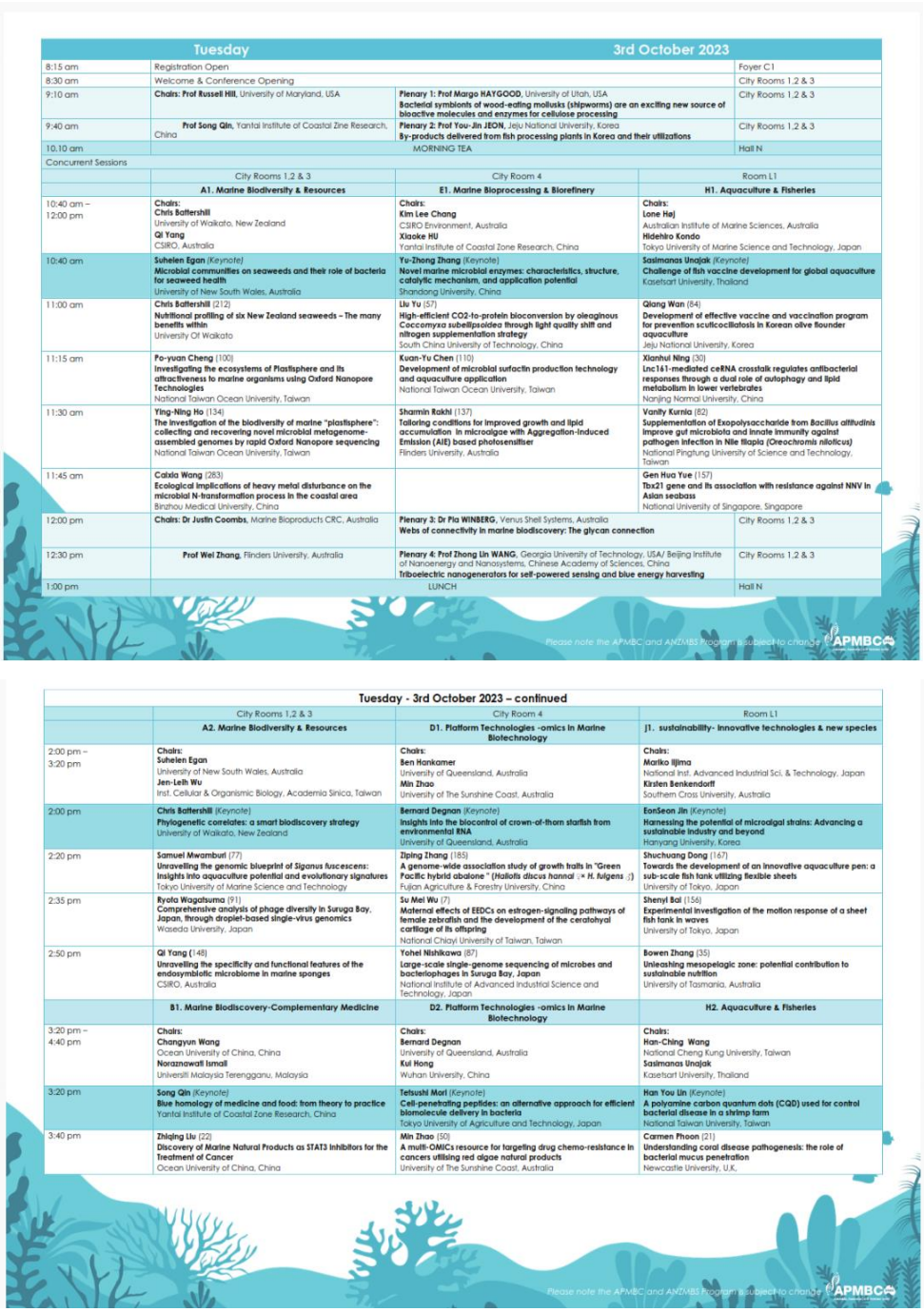


圖 3、第一天 10/2 講座海報



Tuesday	3rd October 2023		
8:15 am	Registration Open		Foyer C1
8:30 am	Welcome & Conference Opening		City Rooms 1,2 & 3
9:10 am	**Chairs: Prof Russell Hill**, University of Maryland, USA	**Plenary 1: Prof Margo HAYGOOD**, University of Utah, USA **Bacterial symbionts of wood-eating molluscs (shipworms) are an exciting new source of bioactive molecules and enzymes for cellulose processing**	City Rooms 1,2 & 3
9:40 am	**Prof Song Qin**, Yantai Institute of Coastal Zine Research, China	**Plenary 2: Prof You-Jin JEON**, Jeju National University, Korea **By-products delivered from fish processing plants in Korea and their utilizations**	City Rooms 1,2 & 3
10.10 am	MORNING TEA		Hall N
Concurrent Sessions			
	City Rooms 1,2 & 3	City Room 4	Room L1
	A1. Marine Biodiversity & Resources	**E1. Marine Bioprocessing & Biorefinery**	**H1. Aquaculture & Fisheries**
10:40 am – 12:00 pm	**Chairs:** **Chris Battershill** University of Waikato, New Zealand **Qi Yang** CSIRO, Australia	**Chairs:** **Kim Lee Chang** CSIRO Environment, Australia **Xiaoke HU** Yantai Institute of Coastal Zone Research, China	**Chairs:** **Lone Høj** Australian Institute of Marine Sciences, Australia **Hidehiro Kondo** Tokyo University of Marine Science and Technology, Japan
10:40 am	**Suhelen Egan** *(Keynote)* **Microbial communities on seaweeds and their role of bacteria for seaweed health** University of New South Wales, Australia	**Yu-Zhong Zhang** *(Keynote)* **Novel marine microbial enzymes: characteristics, structure, catalytic mechanism, and application potential** Shandong University, China	**Sasimanas Unajak** *(Keynote)* **Challenge of fish vaccine development for global aquaculture** Kasetsart University, Thailand
11:00 am	**Chris Battershill** (212) **Nutritional profiling of six New Zealand seaweeds – The many benefits within** University Of Waikato	**Liu Yu** (57) **High-efficient CO2-to-protein bioconversion by oleaginous *Coccomyxa subellipsoidea* through light quality shift and nitrogen supplementation strategy** South China University of Technology, China	**Qiang Wan** (84) **Development of effective vaccine and vaccination program for prevention scuticociliatosis in Korean olive flounder aquaculture** Jeju National University, Korea
11:15 am	**Po-yuan Cheng** (100) **Investigating the ecosystems of Plastisphere and its attractiveness to marine organisms using Oxford Nanopore Technologies** National Taiwan Ocean University, Taiwan	**Kuan-Yu Chen** (110) **Development of microbial surfactin production technology and aquaculture application** National Taiwan Ocean University, Taiwan	**Xianhui Ning** (30) **Lnc161-mediated ceRNA crosstalk regulates antibacterial responses through a dual role of autophagy and lipid metabolism in lower vertebrates** Nanjing Normal University, China
11:30 am	**Ying-Ning Ho** (134) **The investigation of the biodiversity of marine "plastisphere": collecting and recovering novel microbial metagenome-assembled genomes by rapid Oxford Nanopore sequencing** National Taiwan Ocean University, Taiwan	**Sharmin Rakhi** (137) **Tailoring conditions for improved growth and lipid accumulation in microalgae with Aggregation-Induced Emission (AIE) based photosensitiser** Flinders University, Australia	**Vanity Kurnia** (82) **Supplementation of Exopolysaccharide from *Bacillus altitudinis* improve gut microbiota and innate immunity against pathogen infection in Nile tilapia (*Oreochromis niloticus*)** National Pingtung University of Science and Technology, Taiwan
11:45 am	**Caixia Wang** (283) **Ecological implications of heavy metal disturbance on the microbial N-transformation process in the coastal area** Binzhou Medical University, China		**Gen Hua Yue** (157) **Tbx21 gene and its association with resistance against NNV in Asian seabass** National University of Singapore, Singapore
12:00 pm	**Chairs: Dr Justin Coombs**, Marine Bioproducts CRC, Australia	**Plenary 3: Dr Pia WINBERG**, Venus Shell Systems, Australia **Webs of connectivity in marine biodiscovery: The glycan connection**	City Rooms 1,2 & 3
12:30 pm	**Prof Wei Zhang**, Flinders University, Australia	**Plenary 4: Prof Zhong Lin WANG**, Georgia University of Technology, USA/ Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, China **Triboelectric nanogenerators for self-powered sensing and blue energy harvesting**	City Rooms 1,2 & 3
1:00 pm	LUNCH		Hall N

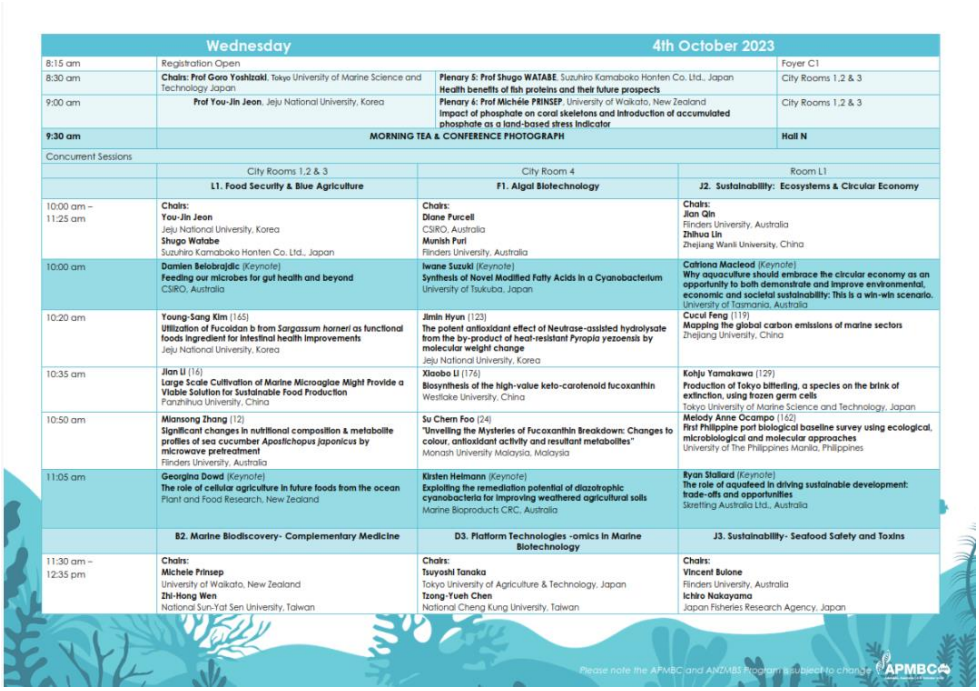
Please note the APMBC and ANZMBS Program is subject to change

Tuesday - 3rd October 2023 – continued			
	City Rooms 1,2 & 3	City Room 4	Room L1
	A2. Marine Biodiversity & Resources	**D1. Platform Technologies -omics in Marine Biotechnology**	**J1. sustainability- innovative technologies & new species**
2:00 pm – 3:20 pm	**Chairs:** **Suhelen Egan** University of New South Wales, Australia **Jen-Leih Wu** Inst. Cellular & Organismic Biology, Academia Sinica, Taiwan	**Chairs:** **Ben Hankamer** University of Queensland, Australia **Min Zhao** University of The Sunshine Coast, Australia	**Chairs:** **Mariko Iijima** National Inst. Advanced Industrial Sci. & Technology, Japan **Kirsten Benkendorff** Southern Cross University, Australia
2:00 pm	**Chris Battershill** (Keynote) **Phylogenetic correlates: a smart biodiscovery strategy** University of Waikato, New Zealand	**Bernard Degnan** (Keynote) **Insights into the biocontrol of crown-of-thorn starfish from environmental RNA** University of Queensland, Australia	**EonSeon Jin** (Keynote) **Harnessing the potential of microalgal strains: Advancing a sustainable industry and beyond** Hanyang University, Korea
2:20 pm	**Samuel Mwamburi** (77) **Unravelling the genomic blueprint of *Siganus fuscescens*: Insights into aquaculture potential and evolutionary signatures** Tokyo University of Marine Science and Technology	**Ziping Zhang** (185) **A genome-wide association study of growth traits in "Green Pacific hybrid abalone" (*Haliotis discus hannai* ♀× *H. fulgens* ♂)** Fujian Agriculture & Forestry University, China	**Shuchuang Dong** (167) **Towards the development of an innovative aquaculture pen: a sub-scale fish tank utilizing flexible sheets** University of Tokyo, Japan
2:35 pm	**Ryota Wagatsuma** (91) **Comprehensive analysis of phage diversity in Suruga Bay, Japan, through droplet-based single-virus genomics** Waseda University, Japan	**Su Mei Wu** (7) **Maternal effects of EEDCs on estrogen-signaling pathways of female zebrafish and the development of the ceratohyal cartilage of its offspring** National Chiayi University of Taiwan, Taiwan	**Shenyi Bai** (156) **Experimental investigation of the motion response of a sheet fish tank in waves** University of Tokyo, Japan
2:50 pm	**Qi Yang** (148) **Unravelling the specificity and functional features of the endosymbiotic microbiome in marine sponges** CSIRO, Australia	**Yohei Nishikawa** (87) **Large-scale single-genome sequencing of microbes and bacteriophages in Suruga Bay, Japan** National Institute of Advanced Industrial Science and Technology, Japan	**Bowen Zhang** (35) **Unleashing mesopelagic zone: potential contribution to sustainable nutrition** University of Tasmania, Australia
	B1. Marine Biodiscovery-Complementary Medicine	**D2. Platform Technologies -omics in Marine Biotechnology**	**H2. Aquaculture & Fisheries**
3:20 pm – 4:40 pm	**Chairs:** **Changyun Wang** Ocean University of China, China **Noraznawati Ismail** Universiti Malaysia Terengganu, Malaysia	**Chairs:** **Bernard Degnan** University of Queensland, Australia **Kui Hong** Wuhan University, China	**Chairs:** **Han-Ching Wang** National Cheng Kung University, Taiwan **Sasimanas Unajak** Kasetsart University, Thailand
3:20 pm	**Song Qin** (Keynote) **Blue homology of medicine and food: from theory to practice** Yantai Institute of Coastal Zone Research, China	**Tetsushi Mori** (Keynote) **Cell-penetrating peptides: an alternative approach for efficient biomolecule delivery in bacteria** Tokyo University of Agriculture and Technology, Japan	**Han You Lin** (Keynote) **A polyamine carbon quantum dots (CQD) used for control bacterial disease in a shrimp farm** National Taiwan University, Taiwan
3:40 pm	**Zhiqing Liu** (22) **Discovery of Marine Natural Products as STAT3 Inhibitors for the Treatment of Cancer** Ocean University of China, China	**Min Zhao** (50) **A multi-OMICs resource for targeting drug chemo-resistance in cancers utilising red algae natural products** University of The Sunshine Coast, Australia	**Carmen Phoon** (21) **Understanding coral disease pathogenesis: the role of bacterial mucus penetration** Newcastle University, U.K.

Please note the APMBC and ANZMBS Program is subject to change

Tuesday - 3rd October 2023 – continued			
	City Rooms 1,2 & 3	City Room 4	Room L1
3:55 pm	**Hui Li** (128) **Marine Traditional Chinese medicine inheritance and innovation project** Shandong University of Trad. Chinese Medicine	**Zhenghong Sui** (10) **Characterization of ubiquitin system and their regulation on the tetrasporophyte development of *Gracilariopsis lemaneiformis* (Rhodophyte)** Ocean University of China, China	**Pongsakorn Sukonthamarn** (45) **Hemocytin, an innate immune protein, facilitates *Enterocytozoon hepatopenaei* spore aggregation and possibly induces prophenoloxidase activating cascade in *Litopenaeus vannamei*** Chulalongkorn University, Thailand
4:10 pm	**Hong Wang** (282) **Global analysis of the secondary metabolic potential of marine prokaryotes** Zhejiang University of Technology, China	**Hyun-Sik Yun** (203) **Screening of autonomously replicating sequences in the marine diatom *Phaeodactylum tricornutum* toward arterial chromosome development** University of Tsukuba, Japan	**Hidehiro Kondo** (131) **The challenge of developing a vaccine against skin flukes in Seriola fish species** Tokyo University of Marine Science and Technology, Japan
4:25 pm	**Prof Bin WU** (Keynote) **Bioactive secondary metabolites from oceanic hydrothermal vent sediments-derived fungi** Zhejiang University, China	Wenli Li (107) **Genome mining of marine microbial natural products and their biosynthesis** Northwest Agriculture and Fisheries University, China	**Rolissa Ballantyne** (154) **Effects of adenosine 5'-monophosphate-activated protein kinase on the immunity and resistance of white shrimp, *Penaeus vannamei* to *Vibrio alginolyticus*** National Pintung University of Science and Technology, Taiwan
4:40 pm	AFTERNOON TEA		Hall N
5:00 pm	**Students & ECRs Forum**		City Rooms 1,2 & 3
7:00 pm	Pub Crawl		Adelaide

圖 4、第二天 10/3 講座海報



Wednesday	4th October 2023		
8:15 am	Registration Open		Foyer C1
8:30 am	**Chairs: Prof Goro Yoshizaki**, Tokyo University of Marine Science and Technology Japan	**Plenary 5: Prof Shugo WATABE**, Suzuhiro Kamaboko Honten Co. Ltd., Japan **Health benefits of fish proteins and their future prospects**	City Rooms 1,2 & 3
9:00 am	**Prof You-Jin Jeon**, Jeju National University, Korea	**Plenary 6: Prof Michèle PRINSEP**, University of Waikato, New Zealand **Impact of phosphate on coral skeletons and introduction of accumulated phosphate as a land-based stress indicator**	City Rooms 1,2 & 3
9:30 am	**MORNING TEA & CONFERENCE PHOTOGRAPH**		**Hall N**

Concurrent Sessions

	City Rooms 1,2 & 3	City Room 4	Room L1
	L1. Food Security & Blue Agriculture	**F1. Algal Biotechnology**	**J2. Sustainability: Ecosystems & Circular Economy**
10:00 am – 11:25 am	**Chairs:** **You-Jin Jeon** Jeju National University, Korea **Shugo Watabe** Suzuhiro Kamaboko Honten Co. Ltd., Japan	**Chairs:** **Diane Purcell** CSIRO, Australia **Munish Puri** Flinders University, Australia	**Chairs:** **Jian Qin** Flinders University, Australia **Zhihua Lin** Zhejiang Wanli University, China
10:00 am	**Damien Belobrajdic** (Keynote) **Feeding our microbes for gut health and beyond** CSIRO, Australia	**Iwane Suzuki** (Keynote) **Synthesis of Novel Modified Fatty Acids in a Cyanobacterium** University of Tsukuba, Japan	**Catriona Macleod** (Keynote) **Why aquaculture should embrace the circular economy as an opportunity to both demonstrate and improve environmental, economic and societal sustainability: This is a win-win scenario.** University of Tasmania, Australia
10:20 am	**Young-Sang Kim** (165) **Utilization of Fucoidan b from *Sargassum horneri* as functional foods ingredient for intestinal health improvements** Jeju National University, Korea	**Jimin Hyun** (123) **The potent antioxidant effect of Neutrase-assisted hydrolysate from the by-product of heat-resistant *Pyropia yezoensis* by molecular weight change** Jeju National University, Korea	**Cucui Feng** (119) **Mapping the global carbon emissions of marine sectors** Zhejiang University, China
10:35 am	**Jian Li** (16) **Large Scale Cultivation of Marine Microalgae Might Provide a Viable Solution for Sustainable Food Production** Panzhihua University, China	**Xiaobo Li** (176) **Biosynthesis of the high-value keto-carotenoid fucoxanthin** Westlake University, China	**Kohju Yamakawa** (129) **Production of Tokyo bitterling, a species on the brink of extinction, using frozen germ cells** Tokyo University of Marine Science and Technology, Japan
10:50 am	**Miansong Zhang** (12) **Significant changes in nutritional composition & metabolite profiles of sea cucumber *Apostichopus japonicus* by microwave pretreatment** Flinders University, Australia	**Su Chern Foo** (24) **"Unveiling the Mysteries of Fucoxanthin Breakdown: Changes to colour, antioxidant activity and resultant metabolites"** Monash University Malaysia, Malaysia	**Melody Anne Ocampo** (162) **First Philippine port biological baseline survey using ecological, microbiological and molecular approaches** University of The Philippines Manila, Philippines
11:05 am	**Georgina Dowd** (Keynote) **The role of cellular agriculture in future foods from the ocean** Plant and Food Research, New Zealand	**Kirsten Heimann** (Keynote) **Exploiting the remediation potential of diazotrophic cyanobacteria for improving weathered agricultural soils** Marine Bioproducts CRC, Australia	**Ryan Stallard** (Keynote) **The role of aquafeed in driving sustainable development: trade-offs and opportunities** Skretting Australia Ltd., Australia
	B2. Marine Biodiscovery- Complementary Medicine	**D3. Platform Technologies -omics in Marine Biotechnology**	**J3. Sustainability- Seafood Safety and Toxins**
11:30 am – 12:35 pm	**Chairs:** **Michele Prinsep** University of Waikato, New Zealand **Zhi-Hong Wen** National Sun-Yat Sen University, Taiwan	**Chairs:** **Tsuyoshi Tanaka** Tokyo University of Agriculture & Technology, Japan **Tzong-Yueh Chen** National Cheng Kung University, Taiwan	**Chairs:** **Vincent Bulone** Flinders University, Australia **Ichiro Nakayama** Japan Fisheries Research Agency, Japan

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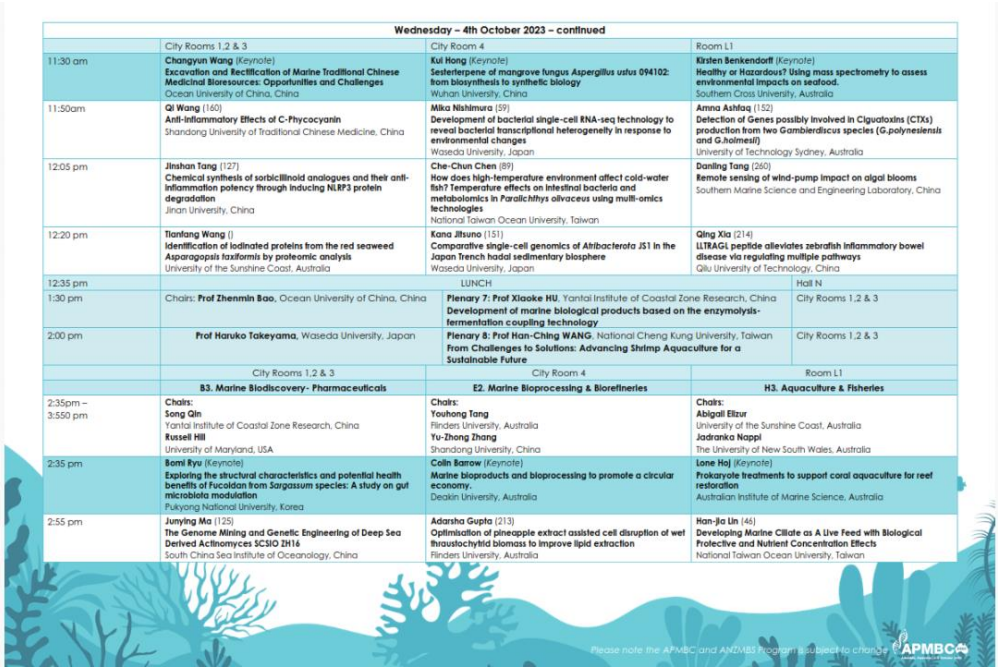

Wednesday – 4th October 2023 – continued

	City Rooms 1,2 & 3	City Room 4	Room L1
11:30 am	**Changyun Wang** (Keynote) **Excavation and Rectification of Marine Traditional Chinese Medicinal Bioresources: Opportunities and Challenges** Ocean University of China, China	**Kui Hong** (Keynote) **Sesterterpene of mangrove fungus *Aspergillus ustus* 094102: from biosynthesis to synthetic biology** Wuhan University, China	**Kirsten Benkendorff** (Keynote) **Healthy or Hazardous? Using mass spectrometry to assess environmental impacts on seafood.** Southern Cross University, Australia
11:50am	**Qi Wang** (160) **Anti-inflammatory Effects of C-Phycocyanin** Shandong University of Traditional Chinese Medicine, China	**Mika Nishimura** (59) **Development of bacterial single-cell RNA-seq technology to reveal bacterial transcriptional heterogeneity in response to environmental changes** Waseda University, Japan	**Amna Ashfaq** (152) **Detection of Genes possibly involved in Ciguatoxins (CTXs) production from two Gambierdiscus species (*G.polynesiensis* and *G.holmesii*)** University of Technology Sydney, Australia
12:05 pm	**Jinshan Tang** (127) **Chemical synthesis of sorbicillinoid analogues and their anti-inflammation potency through inducing NLRP3 protein degradation** Jinan University, China	**Che-Chun Chen** (89) **How does high-temperature environment affect cold-water fish? Temperature effects on intestinal bacteria and metabolomics in *Paralichthys olivaceus* using multi-omics technologies** National Taiwan Ocean University, Taiwan	**Danling Tang** (260) **Remote sensing of wind-pump impact on algal blooms** Southern Marine Science and Engineering Laboratory, China
12:20 pm	**Tianfang Wang** () **Identification of iodinated proteins from the red seaweed *Asparagopsis taxiformis* by proteomic analysis** University of the Sunshine Coast, Australia	**Kana Jitsuno** (151) **Comparative single-cell genomics of *Atribacterota* JS1 in the Japan Trench hadal sedimentary biosphere** Waseda University, Japan	**Qing Xia** (214) **LLTRAGL peptide alleviates zebrafish inflammatory bowel disease via regulating multiple pathways** Qilu University of Technology, China
12:35 pm	LUNCH		Hall N
1:30 pm	Chairs: **Prof Zhenmin Bao**, Ocean University of China, China	**Plenary 7: Prof Xiaoke HU**, Yantai Institute of Coastal Zone Research, China **Development of marine biological products based on the enzymolysis-fermentation coupling technology**	City Rooms 1,2 & 3
2:00 pm	**Prof Haruko Takeyama**, Waseda University, Japan	**Plenary 8: Prof Han-Ching WANG**, National Cheng Kung University, Taiwan **From Challenges to Solutions: Advancing Shrimp Aquaculture for a Sustainable Future**	City Rooms 1,2 & 3
	City Rooms 1,2 & 3	City Room 4	Room L1
	B3. Marine Biodiscovery- Pharmaceuticals	**E2. Marine Bioprocessing & Biorefineries**	**H3. Aquaculture & Fisheries**
2:35pm – 3:550 pm	**Chairs:** **Song Qin** Yantai Institute of Coastal Zone Research, China **Russell Hill** University of Maryland, USA	**Chairs:** **Youhong Tang** Flinders University, Australia **Yu-Zhong Zhang** Shandong University, China	**Chairs:** **Abigail Elizur** University of the Sunshine Coast, Australia **Jadranka Nappi** The University of New South Wales, Australia
2:35 pm	**Bomi Ryu** (Keynote) **Exploring the structural characteristics and potential health benefits of Fucoidan from *Sargassum* species: A study on gut microbiota modulation** Pukyong National University, Korea	**Colin Barrow** (Keynote) **Marine bioproducts and bioprocessing to promote a circular economy.** Deakin University, Australia	**Lone Hoj** (Keynote) **Prokaryote treatments to support coral aquaculture for reef restoration** Australian Institute of Marine Science, Australia
2:55 pm	**Junying Ma** (125) **The Genome Mining and Genetic Engineering of Deep Sea Derived Actinomyces SCSIO ZH16** South China Sea Institute of Oceanology, China	**Adarsha Gupta** (213) **Optimisation of pineapple extract assisted cell disruption of wet thraustochytrid biomass to improve lipid extraction** Flinders University, Australia	**Han-Jia Lin** (46) **Developing Marine Ciliate as A Live Feed with Biological Protective and Nutrient Concentration Effects** National Taiwan Ocean University, Taiwan

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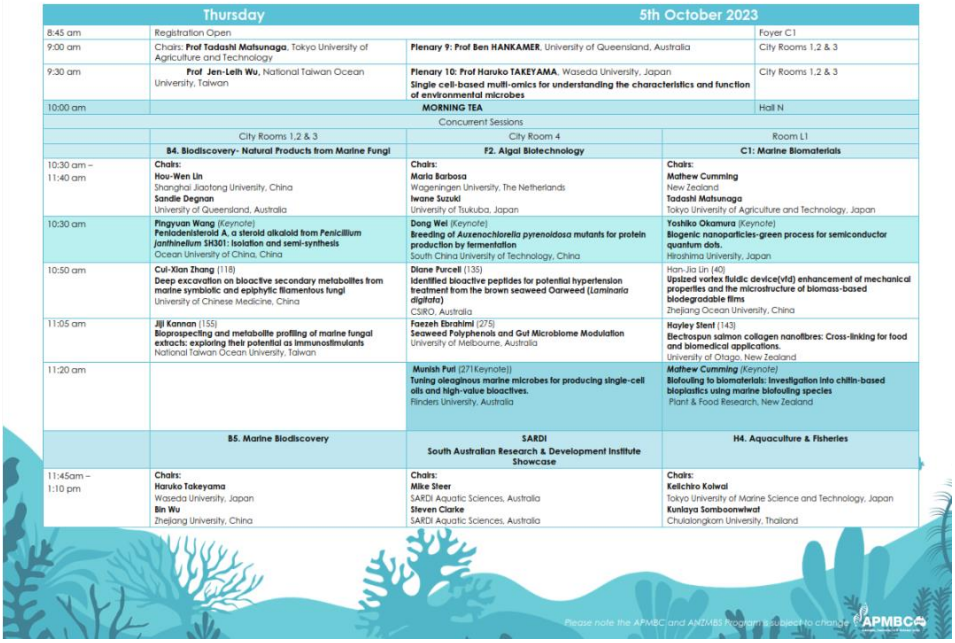
Wednesday – 4th October 2023 – continued

	City Rooms 1,2 & 3	City Room 4	Room L1
3:10 pm	**Russell Hill** **Bacterial symbionts of marine invertebrates: Potential sources of novel pharmaceuticals** University of Maryland, USA	**Youhong Tang** (204) **Aggregation-induced emission aggregates enabled microalgae studies towards commercialization** Flinders University, Australia	**Ichiro Nakayama** (153) **Development of Next Generation Sustainable Aquaculture System in Japan** Japan Fisheries Research Agency, Japan
3:25 pm	**Wei Zhang** (121) **Cytochrome P450 guided novel structure discovery from deep-sea actinomycetes.** Shandong University, China	**Xuekui Xia** (86) **Directed preparation of active substances against drug-resistant bacteria based on sea cucumber body and co-epiphytic microorganisms** Qilu University of Technology, China	**Ryosuke Yazawa** (149) **Development of surrogate broodstock technology in *Scombridae* species using sterile hybrid mackerel as recipients** Tokyo University of Marine Science and Technology, Japan
3:40 pm	**Lan Liu** (70) **Marine Natural product: from mangroves to coral reefs** Sun Yat-sen University, China	**Yong-Ting Kang** (62) **The molecular regulatory mechanism exploration of special polyamine on the osmotic adaptation of marine diatom *Phaeodactylum tricornutum*** National Taiwan Ocean University, Taiwan	**Huayong Que** (194) **Genetic diversity of the Fujian oyster *Crassostrea angulata* from the coast of Fujian province of China** Jimei University, China
3:55 pm	AFTERNOON TEA		Hall N
4:20 pm	Women in Marine Biotechnology Leadership Forum		City Rooms 1,2 & 3
6:00 pm	Close		
7:00 pm	Conference Dinner		Ballroom

圖 5、第三天 10/4 講座海報



Thursday	5th October 2023	
8:45 am	Registration Open	Foyer C1
9:00 am	Chairs: **Prof Tadashi Matsunaga**, Tokyo University of Agriculture and Technology	**Plenary 9: Prof Ben HANKAMER**, University of Queensland, Australia — City Rooms 1,2 & 3
9:30 am	**Prof Jen-Leih Wu**, National Taiwan Ocean University, Taiwan	**Plenary 10: Prof Haruko TAKEYAMA**, Waseda University, Japan — **Single cell-based multi-omics for understanding the characteristics and function of environmental microbes** — City Rooms 1,2 & 3
10:00 am	**MORNING TEA**	Hall N

Concurrent Sessions

	City Rooms 1,2 & 3	City Room 4	Room L1
	B4. Biodiscovery- Natural Products from Marine Fungi	**F2. Algal Biotechnology**	**C1: Marine Biomaterials**
10:30 am – 11:40 am	**Chairs:** **Hou-Wen Lin** Shanghai Jiaotong University, China **Sandie Degnan** University of Queensland, Australia	**Chairs:** **Maria Barbosa** Wageningen University, The Netherlands **Iwane Suzuki** University of Tsukuba, Japan	**Chairs:** **Mathew Cumming** New Zealand **Tadashi Matsunaga** Tokyo University of Agriculture and Technology, Japan
10:30 am	**Pingyuan Wang** (Keynote) **Periadenisteroid A, a steroid alkaloid from *Penicillium janthinellum* SH301: Isolation and semi-synthesis** Ocean University of China, China	**Dong Wei** (Keynote) **Breeding of *Auxenochlorella pyrenoidosa* mutants for protein production by fermentation** South China University of Technology, China	**Yoshiko Okamura** (Keynote) **Biogenic nanoparticles-green process for semiconductor quantum dots.** Hiroshima University, Japan
10:50 am	**Cui-Xian Zhang** (118) **Deep excavation on bioactive secondary metabolites from marine symbiotic and epiphytic filamentous fungi** University of Chinese Medicine, China	**Diane Purcell** (135) **Identified bioactive peptides for potential hypertension treatment from the brown seaweed Oarweed (*Laminaria digitata*)** CSIRO, Australia	Han-Jia Lin (40) **Spiked vortex fluidic device(vfd) enhancement of mechanical properties and the microstructure of biomass-based biodegradable films** Zhejiang Ocean University, China
11:05 am	**Jiji Kannan** (155) **Bioprospecting and metabolite profiling of marine fungal extracts: exploring their potential as immunostimulants** National Taiwan Ocean University, Taiwan	**Faezeh Ebrahimi** (275) **Seaweed Polyphenols and Gut Microbiome Modulation** University of Melbourne, Australia	**Hayley Stent** (143) **Electrospun salmon collagen nanofibres: Cross-linking for food and biomedical applications.** University of Otago, New Zealand
11:20 am		**Munish Puri** (271Keynote)) **Tuning oleaginous marine microbes for producing single-cell oils and high-value bioactives.** Flinders University, Australia	***Mathew Cumming* (Keynote)** **Biofouling to biomaterials: Investigation into chitin-based bioplastics using marine biofouling species** Plant & Food Research, New Zealand
	B5. Marine Biodiscovery	**SARDI** **South Australian Research & Development Institute Showcase**	**H4. Aquaculture & Fisheries**
11:45am – 1:10 pm	**Chairs:** **Haruko Takeyama** Waseda University, Japan **Bin Wu** Zhejiang University, China	**Chairs:** **Mike Steer** SARDI Aquatic Sciences, Australia **Steven Clarke** SARDI Aquatic Sciences, Australia	**Chairs:** **Keiichiro Koiwai** Tokyo University of Marine Science and Technology, Japan **Kuniaya Somboonwiwat** Chulalongkorn University, Thailand

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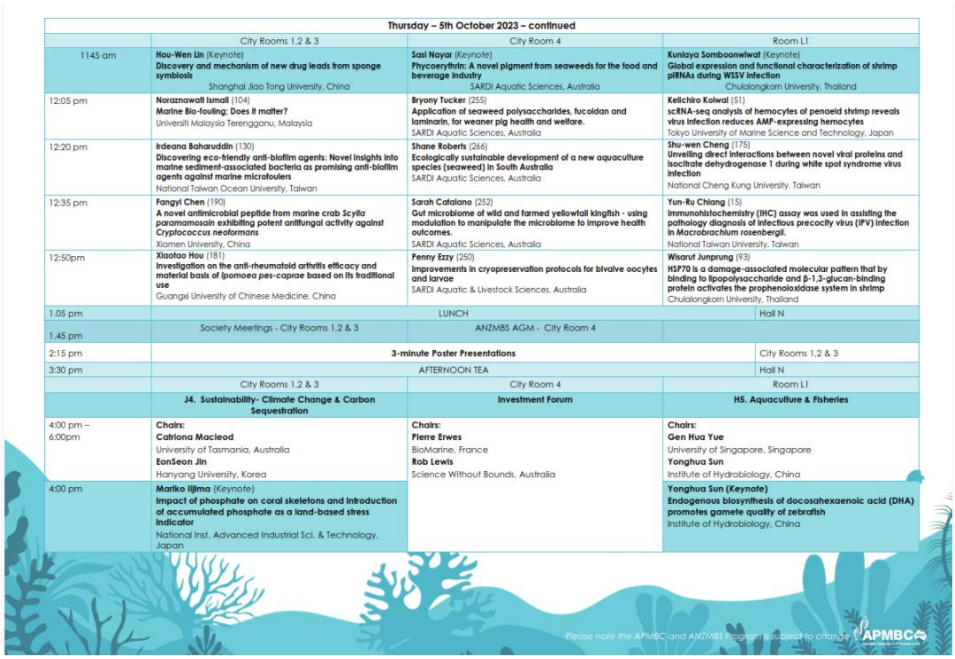

Thursday – 5th October 2023 – continued

	City Rooms 1,2 & 3	City Room 4	Room L1
1145 am	**Hou-Wen Lin** (Keynote) **Discovery and mechanism of new drug leads from sponge symbiosis** Shanghai Jiao Tong University, China	**Sasi Nayar** (Keynote) **Phycoerythrin: A novel pigment from seaweeds for the food and beverage industry** SARDI Aquatic Sciences, Australia	**Kuniaya Somboonwiwat** (Keynote) **Global expression and functional characterization of shrimp piRNAs during WSSV infection** Chulalongkorn University, Thailand
12:05 pm	**Norazmawati Ismail** (104) **Marine Bio-fouling: Does it matter?** Universiti Malaysia Terengganu, Malaysia	**Bryony Tucker** (255) **Application of seaweed polysaccharides, fucoidan and laminarin, for weaner pig health and welfare.** SARDI Aquatic Sciences, Australia	**Keiichiro Koiwai** (51) **scRNA-seq analysis of hemocytes of penaeid shrimp reveals virus infection reduces AMP-expressing hemocytes** Tokyo University of Marine Science and Technology, Japan
12:20 pm	**Irdeana Baharuddin** (130) **Discovering eco-friendly anti-biofilm agents: Novel insights into marine sediment-associated bacteria as promising anti-biofilm agents against marine microfoulers** National Taiwan Ocean University, Taiwan	**Shane Roberts** (266) **Ecologically sustainable development of a new aquaculture species (seaweed) in South Australia** SARDI Aquatic Sciences, Australia	**Shu-wen Cheng** (175) **Unveiling direct interactions between novel viral proteins and isocitrate dehydrogenase 1 during white spot syndrome virus infection** National Cheng Kung University, Taiwan
12:35 pm	**Fangyi Chen** (190) **A novel antimicrobial peptide from marine crab *Scylla paramamosain* exhibiting potent antifungal activity against *Cryptococcus neoformans*** Xiamen University, China	**Sarah Catalano** (252) **Gut microbiome of wild and farmed yellowtail kingfish - using modulation to manipulate the microbiome to improve health outcomes.** SARDI Aquatic Sciences, Australia	**Yun-Ru Chiang** (15) **Immunohistochemistry (IHC) assay was used in assisting the pathology diagnosis of infectious precocity virus (IPV) infection in Macrobrachium rosenbergii.** National Taiwan University, Taiwan
12:50pm	**Xiaotao Hou** (181) **Investigation on the anti-rheumatoid arthritis efficacy and material basis of *Ipomoea pes-caprae* based on its traditional use** Guangxi University of Chinese Medicine, China	**Fenny Ezzy** (250) **Improvements in cryopreservation protocols for bivalve oocytes and larvae** SARDI Aquatic & Livestock Sciences, Australia	**Wisarut Junprung** (93) **HSP70 is a damage-associated molecular pattern that by binding to lipopolysaccharide and β-1,3-glucan-binding protein activates the prophenoloxidase system in shrimp** Chulalongkorn University, Thailand
1.05 pm	LUNCH		Hall N
1.45 pm	Society Meetings - City Rooms 1,2 & 3	ANZMBS AGM - City Room 4	
2:15 pm	**3-minute Poster Presentations**		City Rooms 1,2 & 3
3:30 pm	AFTERNOON TEA		Hall N
	City Rooms 1,2 & 3	City Room 4	Room L1
	J4. Sustainability- Climate Change & Carbon Sequestration	**Investment Forum**	**H5. Aquaculture & Fisheries**
4:00 pm – 6:00pm	**Chairs:** **Catriona Macleod** University of Tasmania, Australia **EonSeon Jin** Hanyang University, Korea	**Chairs:** **Pierre Erwes** BioMarine, France **Rob Lewis** Science Without Bounds, Australia	**Chairs:** **Gen Hua Yue** University of Singapore, Singapore **Yonghua Sun** Institute of Hydrobiology, China
4:00 pm	**Mariko Iijima** (Keynote) **Impact of phosphate on coral skeletons and introduction of accumulated phosphate as a land-based stress indicator** National Inst. Advanced Industrial Sci. & Technology, Japan		**Yonghua Sun *(Keynote)*** **Endogenous biosynthesis of docosahexaenoic acid (DHA) promotes gamete quality of zebrafish** Institute of Hydrobiology, China

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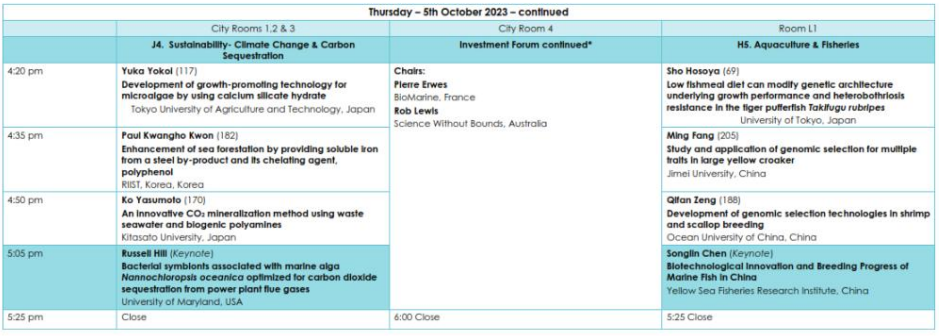

Thursday – 5th October 2023 – continued

	City Rooms 1,2 & 3	City Room 4	Room L1
	J4. Sustainability- Climate Change & Carbon Sequestration	**Investment Forum continued***	**H5. Aquaculture & Fisheries**
4:20 pm	**Yuka Yokoi** (117) **Development of growth-promoting technology for microalgae by using calcium silicate hydrate** Tokyo University of Agriculture and Technology, Japan	**Chairs:** **Pierre Erwes** BioMarine, France **Rob Lewis** Science Without Bounds, Australia	**Sho Hosoya** (69) **Low fishmeal diet can modify genetic architecture underlying growth performance and heterobothriosis resistance in the tiger pufferfish *Takifugu rubripes*** University of Tokyo, Japan
4:35 pm	**Paul Kwangho Kwon** (182) **Enhancement of sea forestation by providing soluble iron from a steel by-product and its chelating agent, polyphenol** RIST, Korea, Korea		**Ming Fang** (205) **Study and application of genomic selection for multiple traits in large yellow croaker** Jimei University, China
4:50 pm	**Ko Yasumoto** (170) **An innovative CO_2 mineralization method using waste seawater and biogenic polyamines** Kitasato University, Japan		**Qifan Zeng** (188) **Development of genomic selection technologies in shrimp and scallop breeding** Ocean University of China, China
5:05 pm	**Russell Hill** (Keynote) **Bacterial symbionts associated with marine alga *Nannochloropsis oceanica* optimized for carbon dioxide sequestration from power plant flue gases** University of Maryland, USA		**Songlin Chen** (Keynote) **Biotechnological Innovation and Breeding Progress of Marine Fish in China** Yellow Sea Fisheries Research Institute, China
5:25 pm	Close	6:00 Close	5:25 Close

圖 6、第四天 10/5 講座海報

Friday	6th October 2023		
8:15 am	Registration Open		Foyer C1
8:30 am	Chairs: **Prof Rob Lewis**, Science Without Borders Australia	**Plenary 11: Mr Pierre ERWES**, Biomarine, France	City Rooms 1,2 & 3
9:00 am	**Dr Pia Winberg**, Venus Shell Systems Ltd.	**Plenary 12: Prof Wei ZHANG**, Flinders University, Australia **Circular Blue Bioeconomy by Design-Empowered Marine Bioindustry 3.0+**	City Rooms 1,2 & 3
Concurrent Sessions			
	City Rooms 1,2 & 3	City Room 4	Room L1
	C2. Marine Biomaterials	**F3. Algal Biotechnology**	**L2. Food security & Blue Agriculture**
9.30 am – 10:55 am	**Chairs:** **Dietmar Hutmacher** Queensland University of Technology, Australia **Han-Jia Lin** National Taiwan Ocean University, Taiwan	**Chairs:** **Pia Wenberg** Venus Shell Systems Ltd., Australia **Jian Li** Panzhihua University, China	**Chairs:** **Georgina Dowd** Plant and Food Research, New Zealand **Damien Belobrajdic** CSIRO,Australia
9:30 am	**Dietmar Hutmacher** (Keynote) **Convergence of Tissue Engineering and Marine Biology** Queensland University of Technology, Australia	**Helen Fitton** (Keynote) **By pre-recorded video (title TBC)** Venus Shell Systems Ltd, Australia	**Eun Kyung Park** (Keynote) **Prospects and Trends of Algae-derived Ingredients for Cosmetic and Food Industry in Korea** Athena Co. Ltd, Korea
9:50 am	**Caitlin Berry-Kilgour** (199) **Decellularised seaweed as a novel biomaterial for treatment of skin wounds** University of Otago, New Zealand	**Wenlei Wang** (189) **Identification of a candidate gene for the orange coloration of the economically important seaweed *Pyropia haitanensis*** Jimei University, China	**Zetty Norhana Balia Yusof** (11) **Seaweed Extracts with Antifungal and Biostimulatory Effects: The Next Generation Formulation Towards Sustainable Crop Production** Universiti Putra Malaysia, Malaysia
10:05 am	**Ryoto Tomoe** (139) **Control of magnetosome membrane lipid composition to improve G protein-coupled receptor activities on the magnetosomes** Tokyo University of Agriculture and Technology, Japan	**Person Pesona Renta** (56) **Condensed Molasses Solubles for Microalgae Cultivation: Feasibility and Growth Optimization of *Aurantiochytrium limacinum* BL10** National Cheng Kung University, Taiwan	
10:20am		**Xiaoxiao Zou** (183) **Physiological and molecular responses of *Caulerpa lentillifera* to temperature stress and evaluation of a low-temperature-tolerant strain** Institute of Tropical Bioscience & Biotechnology, China	**Suvimol Charoensiddhi** (247) **Emerging prebiotics from marine macroalgae and their gut microbiome modulation and metabolite production** Kasetsart University, Thailand
10:35 am	**Min Zhou** (Keynote) **Microalgae-based drug delivery system** Zhejiang University, China	**Maria Barbosa** (9 Keynote) **Hypes, hopes and the way forward for microalgal biotechnology** Wageningen University, The Netherlands	**Hafiz Suleria** (274) **Seaweed as a functional food ingredient: digestibility, bioaccessibility, and bioavailability challenges** University of Melbourne, Australia
10.55 am	MORNING TEA		Hall N
11:25 am	Awards & Prizes		City Rooms 1,2 & 3
11:50 am	Closing Ceremony		City Rooms 1,2 & 3
12:20 noon	Conference Ends		

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圖 7、第五天 10/6 講座海報(最後一天)

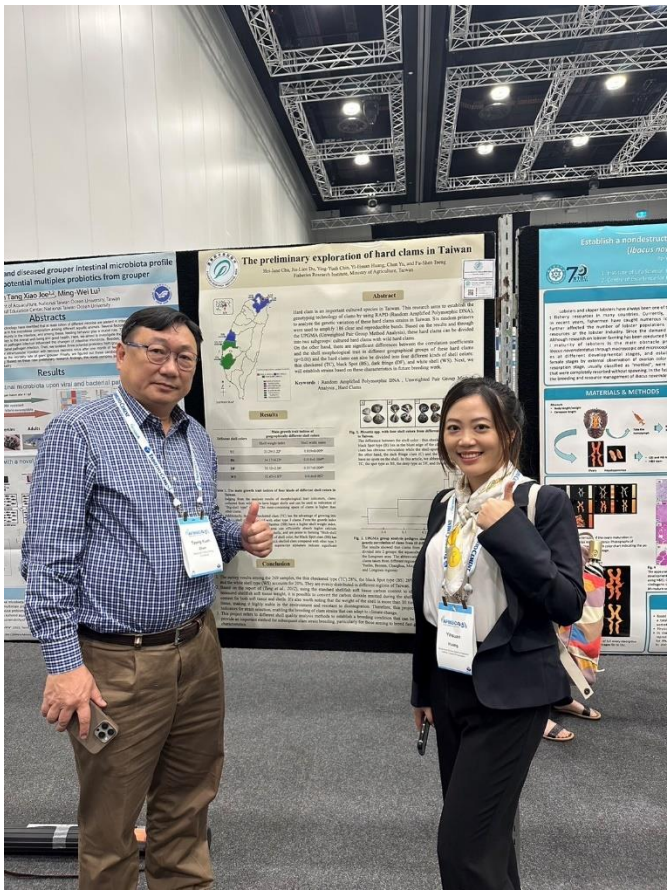


圖 8、筆者研討會海報發表
(筆者與國立成功大學特聘教授陳宗嶽合影)

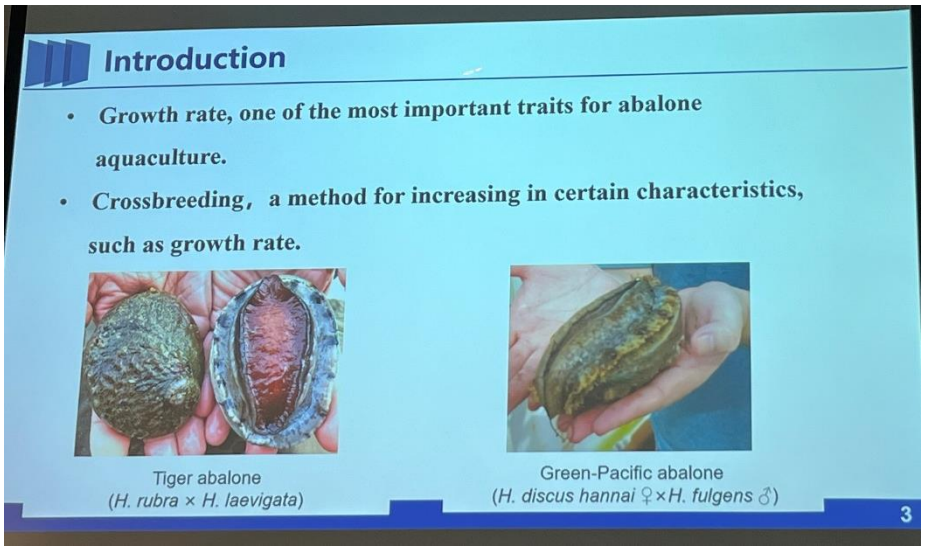
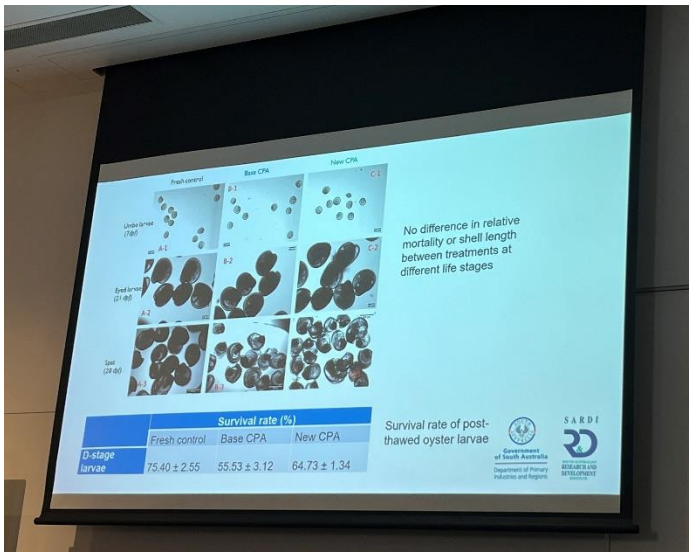
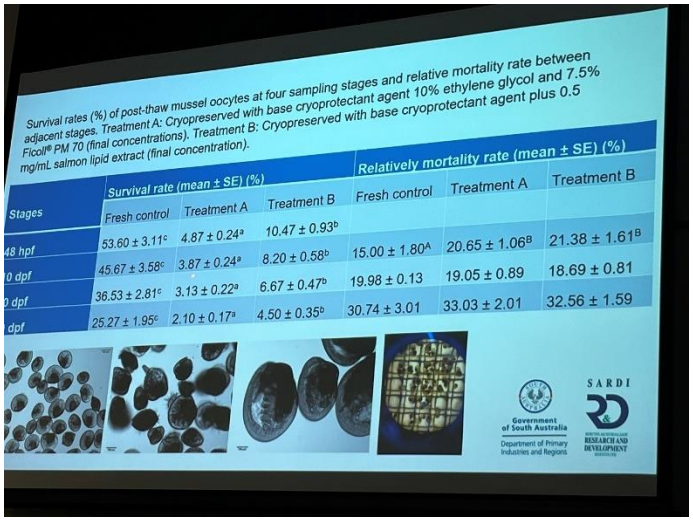


圖 9、鮑魚研究
(研究學校:中國福建大學)





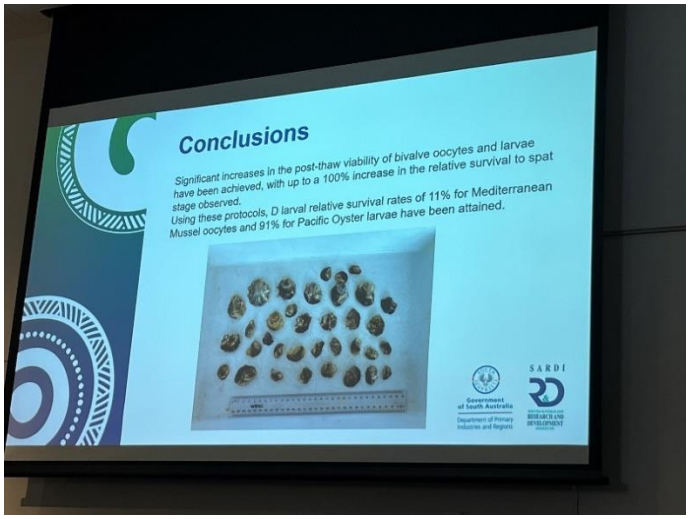
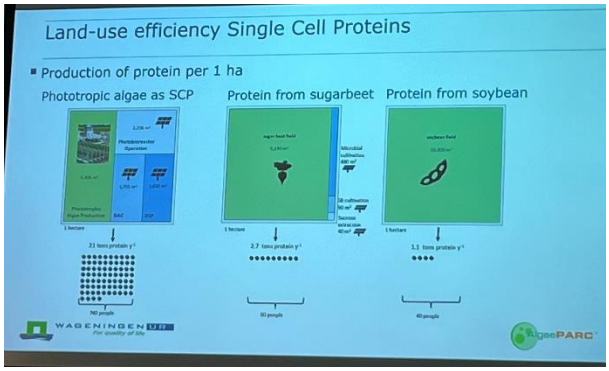
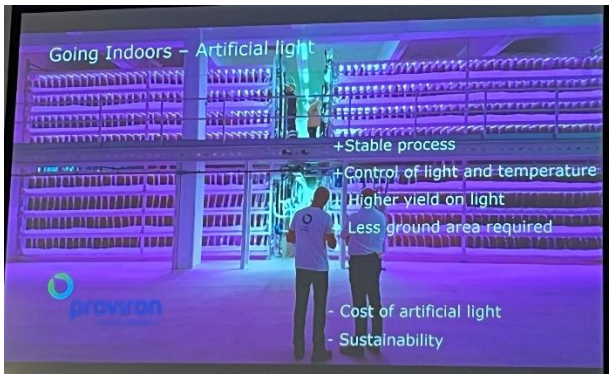
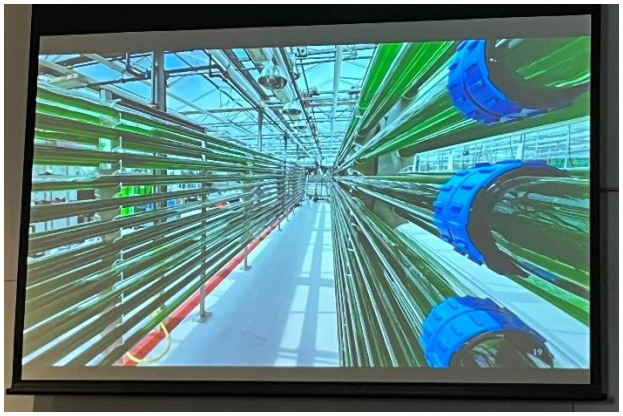


圖 10、牡蠣研究
(南澳政府單位及財團法人 SARDI 資助)







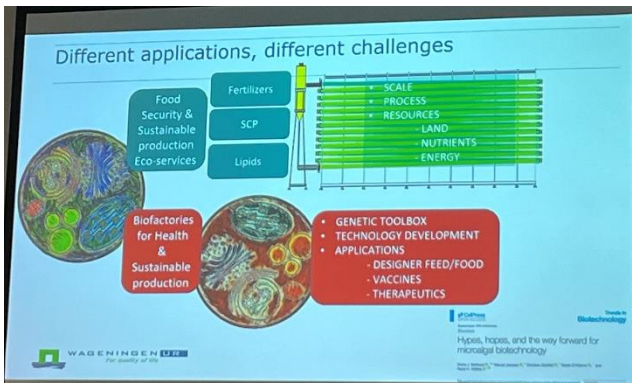


圖 11、荷蘭微藻研究
(荷蘭微藻實驗室)

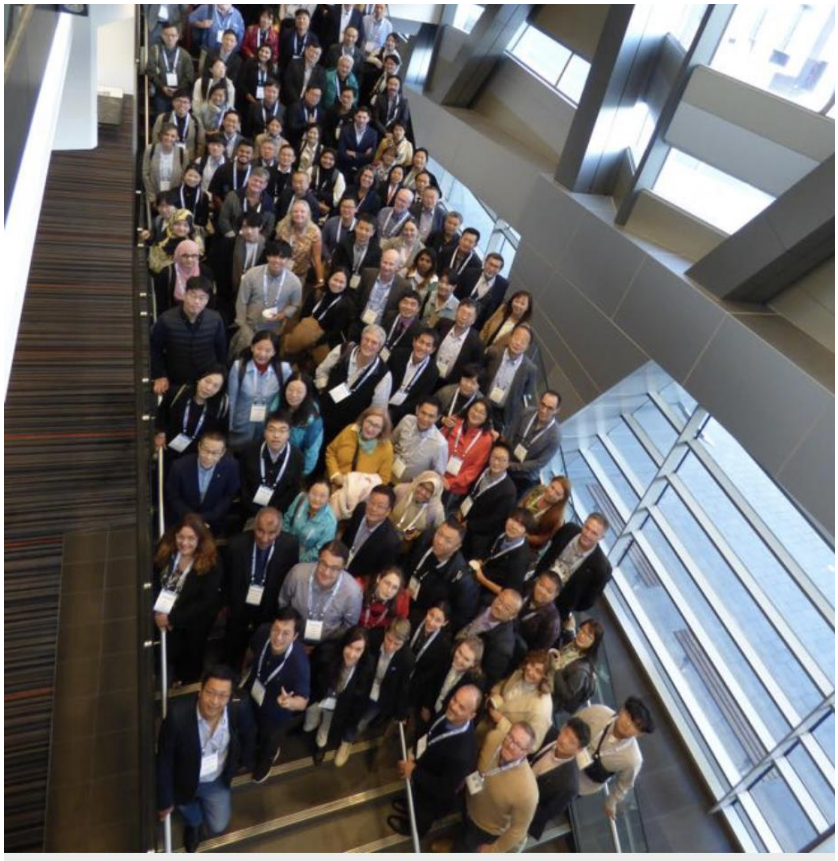


圖 12、筆者與主辦方大合照
(澳洲阿得雷德會議中心)