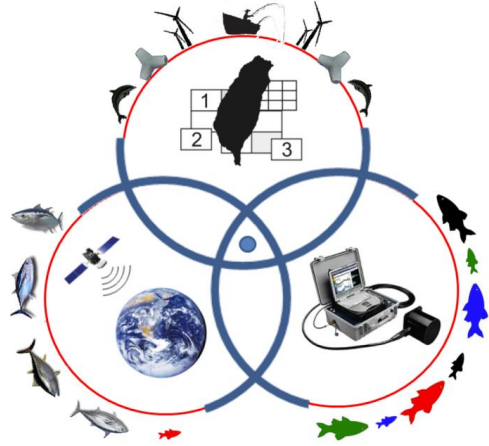


# 漁場資訊研究室

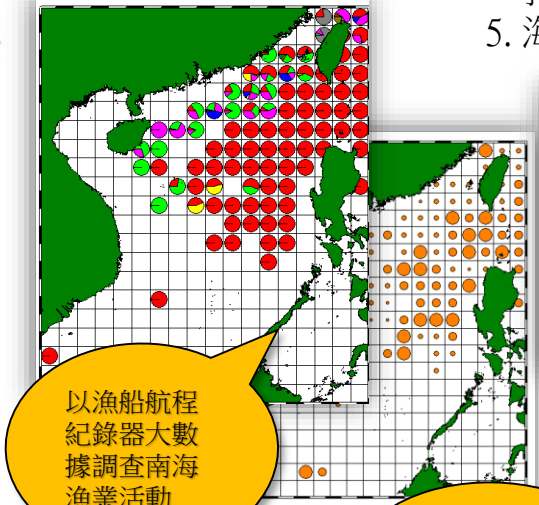


## 呂學榮教授

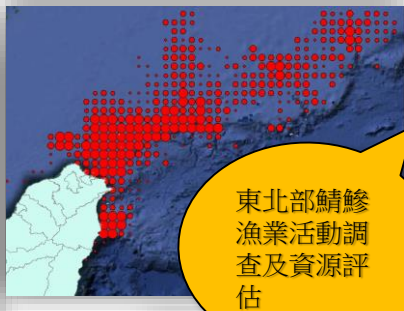
研究專長：漁場環境、水產音響學、地理資訊系統  
研究計畫(執行中)：

1. 鯖鮭漁業資源評估與管理(漁業署/主持人)
2. 南海漁業活動與資源調查(漁業署/主持人)
3. 和平火力發電廠附近海域生態調查(產業界/主持人)
4. 離岸風電生態環境調查--科學魚探調查(產業界/主持人)
5. 海釣推廣專案辦公室(海保署行政委託/主持人)

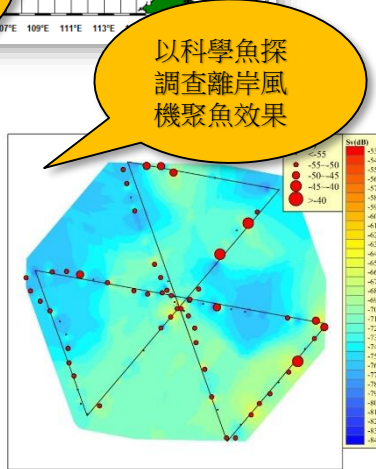
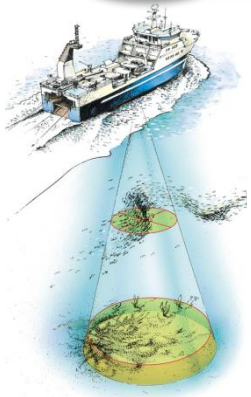
**研究方向：**從事之研究以解決漁業問題為主，鑒於漁業問題錯綜複雜，往往牽涉資源、環境、社會各層面，研究方法上，除傳統的漁業作業資料、生物採集調查外，特別善用科學魚探、衛星遙測及地理資訊系統三項海域空間調查技術，從事各種漁業資源與環境的調查評估研究，近年來主要研究主題有東北部鯖鮭漁業資源評估、台灣及日本定置網漁業、南中國海漁業調查、西部離岸風電與人工魚礁調查評估及海釣推廣專案。



以漁船航程紀錄器大數據調查南海漁業活動



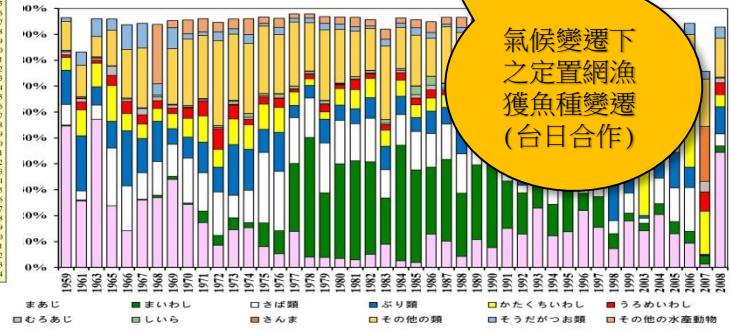
東北部鯖鮭漁業活動調查及資源評估



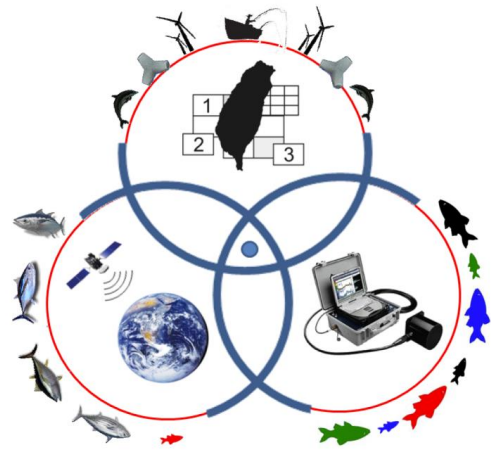
以科學魚探調查離岸風機聚魚效果



氣候變遷下之定置網漁獲魚種變遷(台日合作)



# Lab of Fishing Ground Information



**Lab briefing :** All research topics are related to fishery issues. As selected fishery issues are mostly complex in aspect of fishery resource, marine environment and human society, only use traditional techniques such as fishery data and biological sampling is not enough. We often additionally use objective spatial survey techniques such as scientific echosounder, satellite remote sensing and geographic information system to conduct assessment for fishery resources and environment. In recent years, the main topics of our researches are mackerel stock assessment in NE Taiwan, set net fisheries in Taiwan and Japan, South China Sea fishing activity, offshore wind farm and artificial reefs surveys in western Taiwan and recreational sea fishing promotion project.

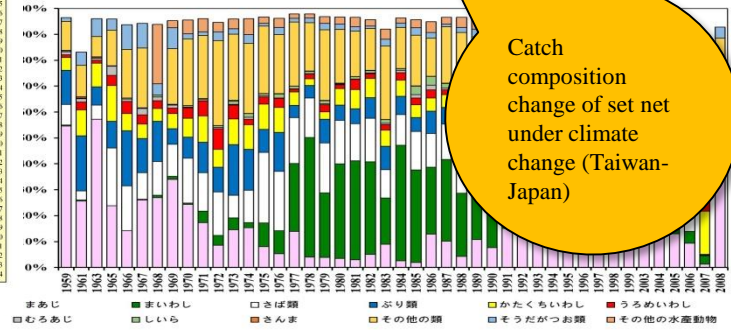
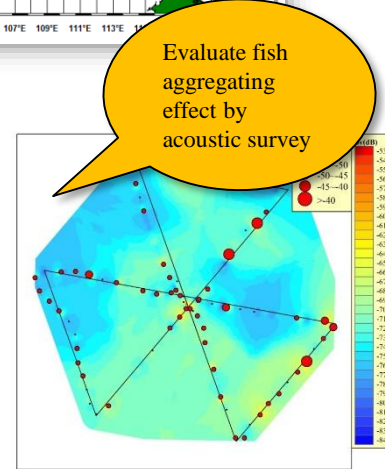
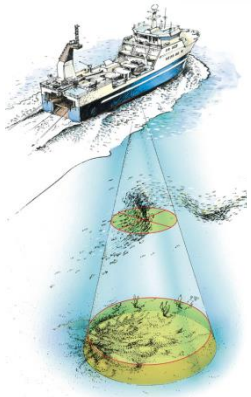
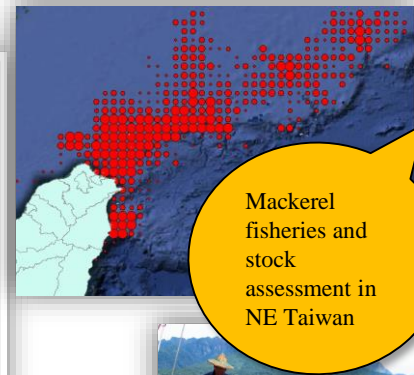
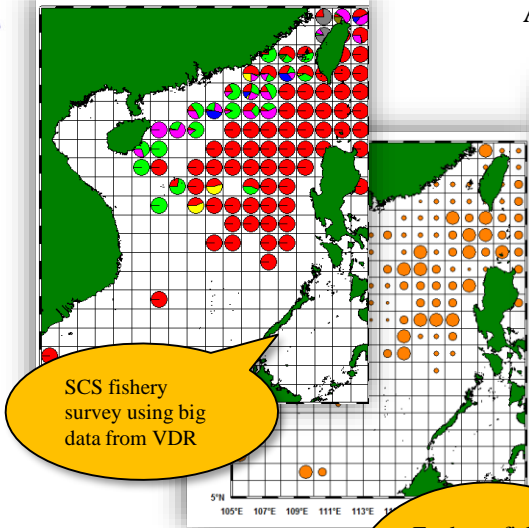


## Prof. Hsueh-Jung

**Specialty :** Fishery Oceanography, Fishery Acoustic, Geographic Information

### Research Projects :

1. Mackerel resource assessment and management (Fishery Agency)
2. Fishery activity and resource survey in South China Sea (Fishery Agency)
3. Ecological survey in waters of Hoping Power Plant (Private Co.)
4. Ecological survey in offshore wind farm-acoustic survey (Private Co.)
5. Sea fishing promotion project office (Ocean Conservation Administration)





### Evaluating the fish aggregation effect of wind turbine facilities by using scientific echo sounder in Nanlong wind farm area, western Taiwan

Ting-Chieh Huang  
National Taiwan Ocean University, Taiwan, ROC

Hsueh-Jung Lu  
National Taiwan Ocean University, Taiwan, ROC, hjlu@email.ntou.edu.tw

Jia-Rong Lin  
National Taiwan Ocean University, Taiwan, ROC

Shih-Hsuan Sun  
National Taiwan Ocean University, Taiwan, ROC

Kou-Wei Yen  
Marine Fisheries Division, Fisheries Research Institute, Taiwan, ROC

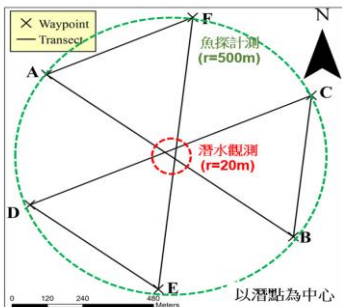
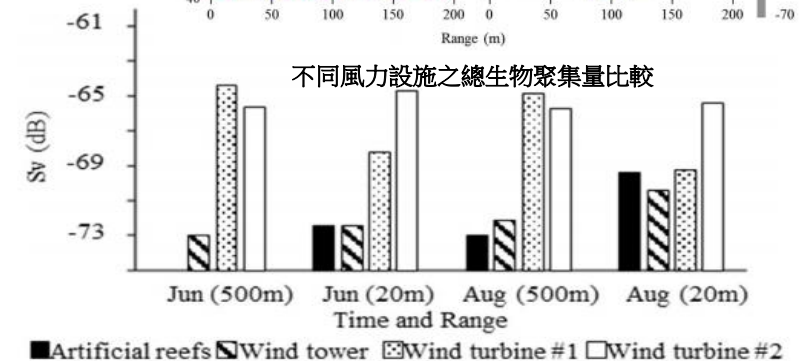
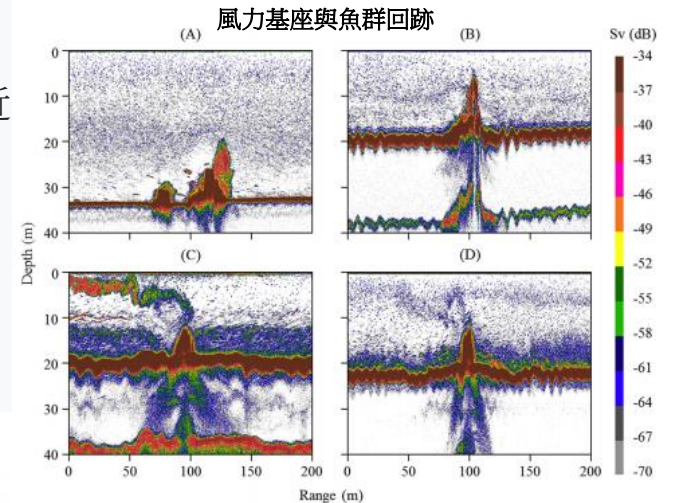
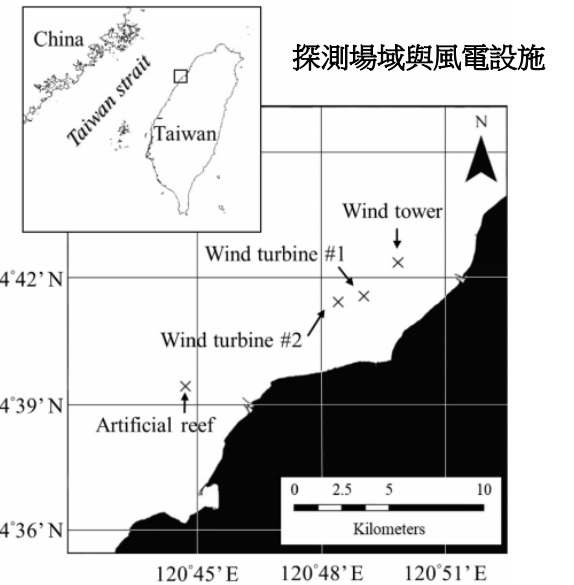
## 以科學魚探評估台灣南龍風場風機聚魚效果

黃鼎傑<sup>12</sup>、呂學榮<sup>\*1</sup>、林佳融<sup>1</sup>、孫士軒<sup>1</sup>、嚴國維<sup>2</sup>

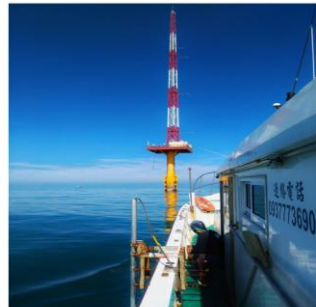
1. 國立臺灣海洋大學 2. 農委會水產試驗所

## 重要研究成果

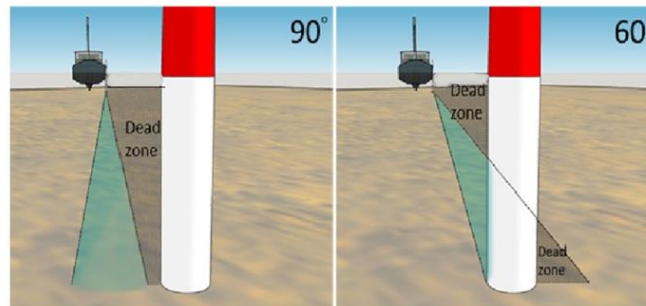
在風電設施建設與運營階段，漁業資源肯定會發生很大的變，風電設施的聚集效應。我們採用科學魚探與水肺潛水來評估此效果。為了獲得非常靠近風機的聲波回訊，本研究採傾斜代替垂直的探測。水槽預備試驗證實聲波在30°和60°傾角時，標物反射強度(TS)與魚體長仍保持線性關係。現場探測在苗栗南龍風力電場進行，以射性穿越線，採用60度傾斜波束角及水肺潛水觀測，評估2座風機、1座測風塔及1座鄰近人工魚礁的聚魚情形。結果表明，在設施附近的核區(<20 m)，TS值與水肺潛水目擊魚體長分佈一致。初步觀測顯示，風力渦輪機的魚聚集效果優於附近的風塔及人工魚礁。



探測範圍與測線規劃



魚探探測通過測風塔實況圖



(A)垂直探測(90度)

(B)傾斜探測(60度)



### Comparison of fish assemblages aggregated by artificial reefs using scuba diving and acoustic surveys

Hsueh-Jung Lu  
National Taiwan Ocean University, Taiwan, ROC, hjlu@email.ntou.edu.tw

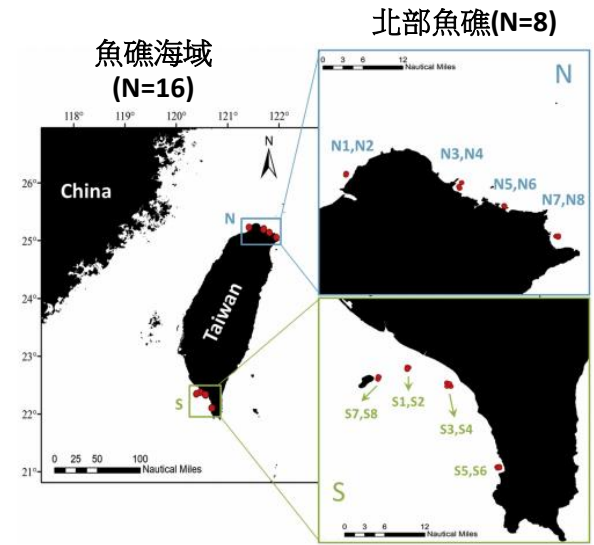
Jia-Rong Lin  
National Taiwan Ocean University, Taiwan, ROC

Ting-Chieh Huang  
National Taiwan Ocean University, Taiwan, ROC

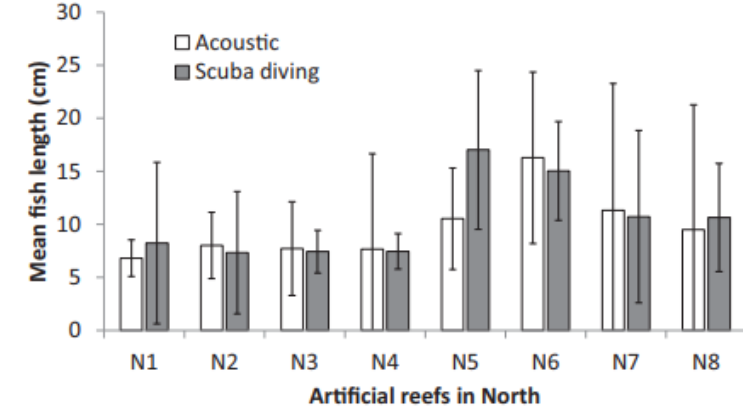
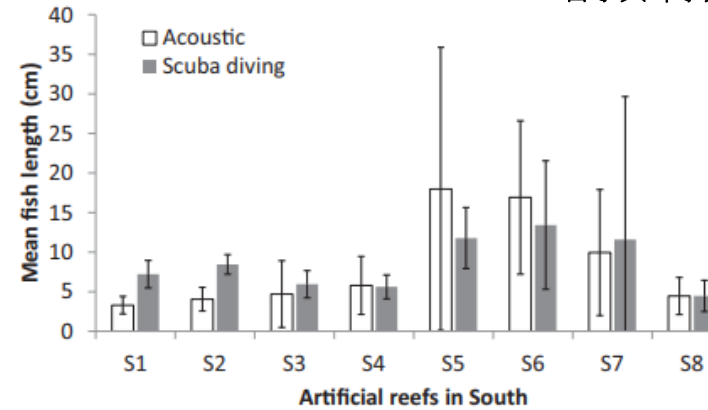
Sunarti Sinaga  
National Taiwan Ocean University, Taiwan, ROC

## 重要研究成果

以 Simrad EK60 (200 KHz)科學魚探結合潛水探測評估台灣16個人工魚礁的聚魚效果，以魚礁為中心進行穿越線現調查，調查時間在2018 年和 2019 年夏天。在魚礁周邊20m 的探測結果顯示，通過聲學調查獲得的定量描述(TS、Sv 和NASC)與水肺潛水(魚體長、總數)具有一致的結果。因潛水範圍有限，無法完成大範圍探測，聲學探測範圍比水肺潛水寬廣許多，且不受環境濁度與能見度的限制，可快速獲得魚礁周邊100m範圍重複穿越的結果，提供客觀的聚魚效果比較，確認魚礁是否仍聚有聚魚功能，作為維護的參考。



目擊與聲學魚體長評估比較

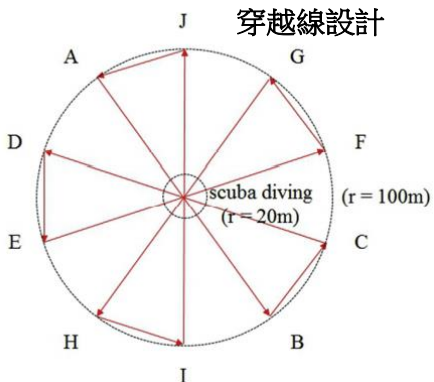


### 以科學魚探配合水肺潛水比較人工魚礁聚魚情形

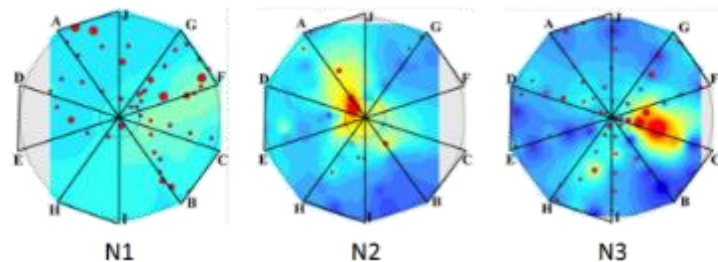
呂學榮<sup>1</sup>、林佳融<sup>1</sup>、黃鼎傑<sup>1,2</sup>、蘇娜<sup>1</sup>

1. 國立臺灣海洋大學
2. 農委會水產試驗所

#### 穿越線設計



#### 聚集密度與目擊體長 North



TS(dB) : < -55, -45 ~ -35, -55 ~ -45, -35 <

Sv (dB): -84 -82 -80 -78 -76 -74 -72 -70

#### 聚集密度與目擊體長 South

