國立臺灣大學海洋研究所海洋生物及漁業組
115 學年度碩士班一般入學考試

各指導教授研究主題一覽

何珮綺老師研究室

Ecological Stoichiometry Laboratory

Dr. Pei-Chi Ho（Email: pcho13806@ntu.edu.tw）

Ecological stoichiometry is the study of elemental ratios in living organisms and ecosystems. In my lab, we investigate the stoichiometry (elemental C:N:P ratios) of marine organisms—particularly plankton—and explore how the elemental imbalances between organisms and environments influence ecological processes in marine systems. Current projects in the lab include: (1) examining the stoichiometry of micro-, nano-, and picoplankton communities and how the dominance of autotrophic versus heterotrophic strategies affects plankton community stoichiometry, (2) studying how zooplankton secondary production and trophic transfer efficiency are impacted by stoichiometric imbalances between zooplankton and their prey, and (3) analyzing taxon-specific stoichiometry in zooplankton. Additionally, we use stable isotope analyses to investigate marine plankton food web structures. If you're interested in plankton and food web ecology and of course, ecological stoichiometry, we welcome you to join us!

生態元素比計量學研究生物體與生態系統中元素比例。我的實驗室測量海洋浮游生物的元素比例（主要為碳：氮：磷這三種重要生物組成元素比例），並探討生物體與環境之間的元素比不平衡如何影響海洋系統中的生態過程。我們目前的研究項目包括：(1) 探索 microplankton、nanoplankton 和 picoplankton 群集的生物元素比，以及自營與異營營養策略的優勢度如何影響浮游生物群集生物元素比；(2) 研究環境變遷下浮游動物的次級生產和營養傳遞效率如何受到浮游動物與其獵物之間元素比失衡的影響；(3) 分析浮游動物特定分類群的生物元素比。此外，我們利用穩定同位素分析來研究海洋浮游生物食物網結構。如果您對浮游生物和食物網生態學有興趣，或想了解生態元素比如何連結海洋生物活動與物質傳遞，歡迎加入我們的研究團隊！

鍾明宗老師研究室
Marine Ecology and Geochemical Application Lab
Dr. Ming-Tsung Chung（Email: mingtsungchung@ntu.edu.tw）

Physiological responses of marine organisms to environmental stress revealed through biochemical and geochemical approaches

Project description

The physiological traits and energetic costs of marine organisms fundamentally shape their distribution, trophic position, and life-history strategies in natural ecosystems. Different functional groups often exhibit distinct physiological strategies and energy allocation patterns when facing environmental pressures, such as temperature fluctuations, salinity gradients, hypoxia, or pH changes. Understanding these divergent responses is essential for predicting how individuals, populations, and communities will adjust to ongoing environmental change.

This project aims to integrate biochemical and geochemical approaches to investigate ontogenetic physiological traits in conjunction with reconstructed environmental histories. We employ a wide range of biochemical analyses, including enzyme activity assays, ATP content, and hormone measurements, as well as geochemical analyses encompassing elemental and isotope systems (e.g., $\delta^{13}C$ metabolic proxies, $\delta^{18}O$ temperature proxies, $^{87}Sr/^{86}Sr$ salinity proxies, and $\delta^{11}B$ pH proxies). The research scope extends from species-level studies of marine macrofauna and megafauna, including crustaceans, cephalopods, fishes, marine mammals, and sea turtles, to broader investigations at population, community, and ecosystem scales. A central focus of the project is the use of diverse biogenic hard structures such as otoliths, statoliths, shells, teeth, bones, and eyestalks for reconstructing physiological and environmental information across life stages. Candidates with experience in biochemical or geochemical analyses, sclerochronology, or research involving the aforementioned taxa are strongly encouraged to apply. We particularly welcome applicants who are motivated to bridge physiology, ecology, and environmental reconstruction using interdisciplinary analytical tools.

葉怡君老師研究室
Marine Microbial Ecology Lab
Dr. Yi-Chun Yeh（Email: yichunyeh@ntu.edu.tw）

Marine microbial community dynamics and its impact on ecosystem functioning

Project description

Marine microbes drive essential processes, including nutrient cycling, carbon sequestration, and climate regulation, that sustain the functioning of the ocean. Our lab investigates how microorganisms, including bacteria, archaea, viruses, and protists, interact with the marine environment across both temporal and spatial scales. We study microbial diversity, ecological dynamics, and their roles in biogeochemical cycles, by integrating field observations, laboratory experiments, and molecular analyses.

We welcome motivated students with backgrounds in biology, microbiology, marine science, environmental science, or related fields. Students in our group will gain hands-on experience in molecular biology, microbiology, bioinformatics, laboratory techniques, and scientific communication, and will also have opportunities to participate in at-sea fieldwork.

Current research projects in our lab include:

1. **Daily time-series monitoring of microbial communities** to understand how microbial interactions respond to environmental changes.
2. **Long-term monitoring of marine β-diversity** to examine how microbial community composition shifts over decadal scales.
3. **Investigating the trophic status of plankton** (autotrophic, heterotrophic, and mixotrophic) and how it varies across environmental gradients.

In addition to joining ongoing projects, prospective students are encouraged to develop independent research based on their own interests.

張以杰老師研究室
Quantitative Fisheries Lab
Dr. Yi-Jay Chang（Email: yjchang@ntu.edu.tw）

漁業資源是地球上極為重要的生物資源，其數量隨時間變化，這些變化可能源於生物本身的特性、海洋生態環境的改變，或人為活動的干擾和影響。海洋並非無限廣大，漁業資源也不是取之不盡、用之不竭。不當捕撈、海洋環境破壞和污染會導致漁業資源的枯竭，並破壞海洋生物的棲息環境。因此，我們需要深入了解海洋生物的生長、存活、再生過程，及其與人類捕撈和環境變動之間的關聯，並以科學為基礎制定全面的漁業管理方法，確保漁業資源得以永續利用。我們研究室將研究成果轉化為科學建議，提供給台灣及國際漁業管理機構，作為制定漁業管理決策的重要參考。

研究主題（4 大方向及細項）

1. 漁業生態與生活史研究

研究洄游性魚類（鮪魚、旗魚等）的生長、成熟、生殖與洄游行為

結合耳石、硬棘與穩定同位素等方法解析生物學特性

2. 漁業資料科學與時空分析

利用統計模型、機器學習與漁業資料分析漁船與魚群動態

建立多物種，捕食者與獵物時空模型

3. 魚類族群動態與資源評估

發展與改良資源評估模型（Stock Synthesis、Bayesian models）

評估漁業資源狀況、永續風險與管理策略

4. 氣候變遷與物種分布

探討暖化、氣候年代際變動（ENSO, PDO）對魚類分布及漁場的影響

建立多模型預測（ensemble SDM）與風險分析框架

以下各位老師的相關資訊請至其個人網站查詢。

謝志豪老師實驗室 https://ecoinformaticsc.webnode.tw/

蕭仁傑老師實驗室 https://www.oc.ntu.edu.tw/staffs/teachers/biol_fish/24543/

陳韋仁老師實驗室 https://sites.google.com/site/wjchenactinops/

魏志漪老師實驗室 https://iobenthos.weebly.com/prospective-student.html

單偉彌老師實驗室 https://www.oc.ntu.edu.tw/staffs/teachers/24561/