

NTNU Summer student internship

Seismological research projects

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Goal: Provide training in advanced seismic data processing (in linux) and introduce you to some of the most exciting aspects of modern seismology

Title: Urban seismology: **Intelligent detection and characterization of recurring shaking in Taipei city**

英文摘要 Abstract

Ambient noise in cities is driven by numerous man-made processes including traffic, subways, airports, and industrial activities. Mounting evidences show that ambient noise in cities could be strong enough to contaminate the seismic catalogues that makes the detection of earthquakes and tremors problematic. A better understanding of noise produced by both atmospheric and anthropogenic activities therefore, is crucial to improve the detection of small tectonic events in populated areas. A good understanding of the spatial and temporal variations of the city noise is crucial and needed, for the successful utilization of seismic noise especially in urban environments. In this summer program, we aim at developing our understanding on **(1) how many types of recurring and strong noise signals is produced by human activities in Taipei (2) what are their characteristics in time and frequency domain** using the continuous data recorded by Formosa Array.

Details:

The internship is designed for a student who has a background in seismology and is interested in learning data processing. This research project involves the analyses of seismic data in a lab setting with the ultimate goal of producing results to be presented at a national scientific meeting. The student will gain:

- - Hands-on research experience
- - Improved observation and communication skills
- - Awareness of the diversity of earthquake research
- - Interaction with graduate students and research assistant who will serve as mentors
- - Opportunity to judge whether a career in research is right for you

城市地震學：環境振動的復發特徵和週期性分析

中文摘要

城市地震學是利用加密的地震網，進行都會區的環境振動量測和特徵分析，這一個領域近年來非常活躍，主要因為-不需要依賴天然地震，環境噪聲(ambient noise)就可被用以解析地下的速度構造。近年來全球大量的「都會加密地震網」發現，對應到慢地震的訊號，和風、空中/陸上交通工具造成的地表物體振動具有相似的頻譜特徵、易被誤判，這開啟了「背景噪訊」特徵和起源的新興領域。本暑期計劃，將讓暑期生利用中央研究院地球科學研究(IES)與大屯火山觀測站(TVO)共同佈設的 Formosa Array 資料，對台北都會區進行環境振動分析：吵雜的背景噪訊特徵為何？有沒有復發行為？其可能來源又是什麼？運用大量的陣列資料如何做邏輯運算和分類判斷？在這個暑期實習機會，你將會學到如何用機器學習手段進行訊號的標籤化和自動分類。

需要的背景及技能：修過地震學相關課程，具程式能力和資料處理經驗尤佳。