

Faculty: Aggeliki Barberopoulou, Lecturer, Urban and Environmental Policy and Planning, Graduate School of Arts & Sciences

Project Locations: Athens, Greece and Medford, MA. If time and conditions permit, additional travel in Greece to Xanthi and Thessaloniki. Remote work from home or at Tufts University/Medford, MA if international travel is not possible in summer 2022.

Dates: Mid-May-mid-August (13 weeks)

Project Title: Historical Earthquakes: Why Exploitation of Historical Data is Important for Hazard Mitigation

Project Details: Dr Barberopoulou's research is interdisciplinary, drawing knowledge from geophysics, coastal engineering and geography with the goal to mitigate disasters' impact through improved understanding and service back to society. She has previously worked with historical earthquake and tsunami data in New Zealand, the US and Greece (e.g., Barberopoulou & Scheele, 2015; Downes, 2017). Digital preservation of historical seismograms, earthquake bulletins, and related documentation (e.g., observatory log books, station books, etc.), is of utmost importance to avoid deterioration and loss over time (Kanamori, 1988) but also allows re-analyses of past earthquakes using modern techniques and reevaluation of seismic hazard. Historically, earthquake data appears in two main forms: records provided by seismometers, and observations of damage, and earthquake effects.

Earthquake records commonly are used to provide a variety of details about the earthquake event, including but not limited to, depth of earthquake, fault which caused it, magnitude, ground shaking details, travel time curves for seismic waves, and duration and amplification of ground motions by local site conditions. Observations are also important and can help complement existing records, construct Intensity maps or help in calibration of models.

Old seismometers were analog and used primarily during the first half of the 20th century. Modern earthquake-recording instruments are digital, but cover only a very small time-window of observations (50-60 years depending on the region), resulting in underestimations of earthquake hazard. Consequently, the earthquake record of most regions is incomplete.

Tasks and Responsibilities of Research Assistant:

The student will receive initial training in working with earthquake records such as: obtaining scanned seismograms and sorting them according to relevant and non-relevant as follows:

- Relevant: Defined as those associated with earthquakes in Greece (earthquakes in Northern Greece will be given priority for further analysis)
- Irrelevant: Defined as earthquakes in other locations outside of Greece
- Given the large amount of records (and depending on time constraints) focus will be placed on Northern Greece only.
- Organizing records is critical as it will define future steps and which events will be further analyzed and published in scientific journals (the latter is out of the scope for this project)
- Student will produce a final report on the project, describing the research project and its results. Report will also include recommendations for future steps as this is the first stage of this work
- Student will participate in a research paper on this topic, earning a co-author status if successful.

Qualifications:

Applicants should have a stated interest in interdisciplinary research and earthquake hazards. Additionally, the successful applicant should demonstrate the following:

- Some knowledge of earthquakes is a plus
- Interest in working with historical data
- Interest in learning about earthquakes and seismicity in Europe and Greece in particular
- Need to be comfortable with computers.
- Great organization, research and writing skills

Description of Field Site:

Research assistant needs to be prepared to work in warm to hot weather (30-35 C/86-95 F). Student must plan to dress appropriately for the weather and remain hydrated. Summer hats and sunscreen are recommended to avoid heat stroke.

Housing in Greece:

Apartment rental in a suburb of Athens, arranged by faculty member. Student and faculty will share the apartment, but have guaranteed private bedroom.