

Earthquake Detective: Engaging Citizens in the Detection of Dynamically Triggered Seismic Events

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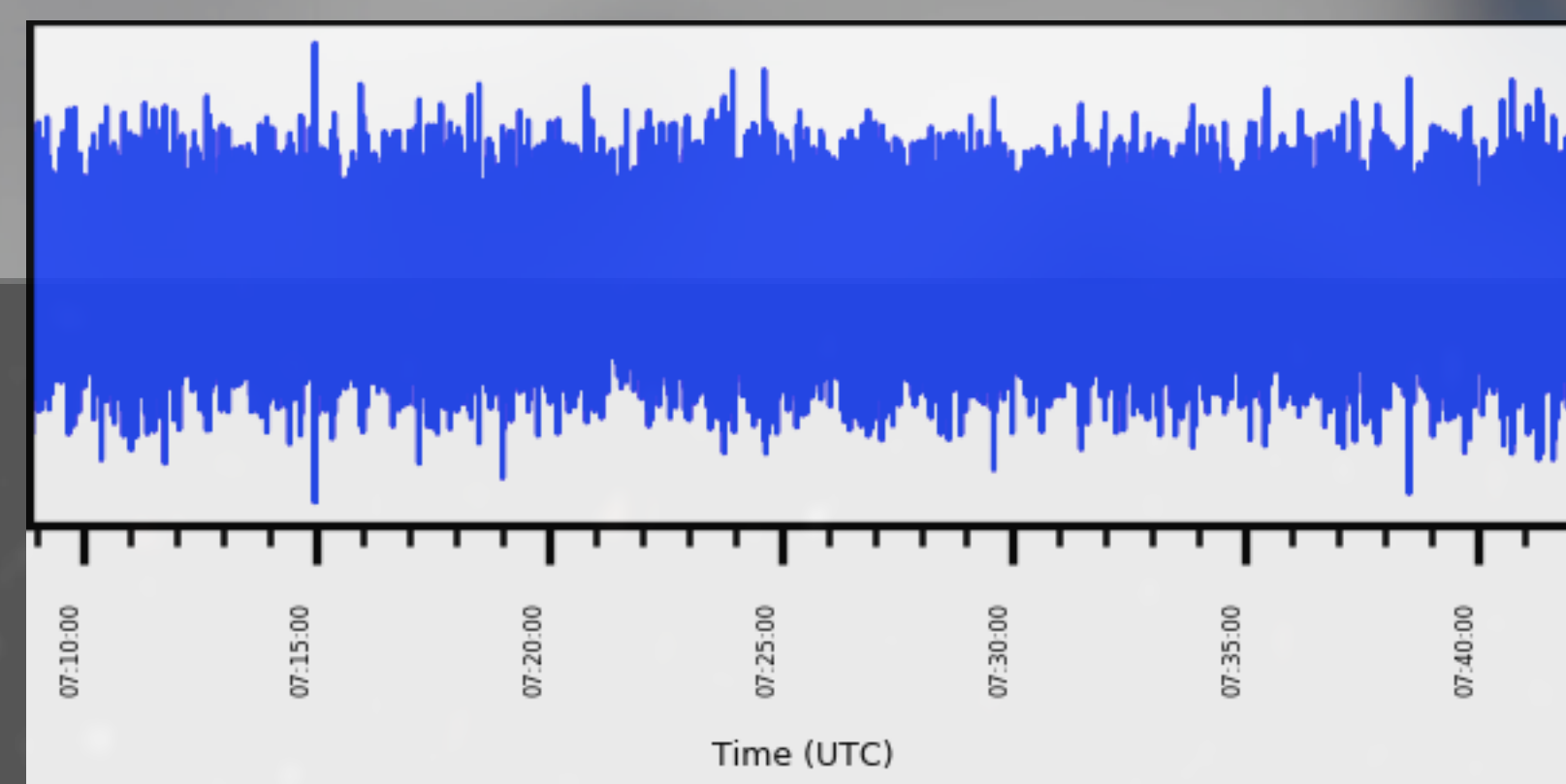
Abstract

We are engaging citizen scientists in an experiment to test if many human ears can replace the process of a professional seismologist in identifying dynamically triggered seismic events. Ordinarily, this process involves interactive data processing and visualization efforts on a volume of earthquake recordings (seismograms) that exploded during the recent big-data revolution, for example through EarthScope. In this citizen seismology project, we ask citizens to listen to relevant sections of seismograms that are accelerated to audible frequencies. This approach has five advantages: 1) The human ear implicitly performs a time-frequency analysis and is capable of discerning a wide range of different signals, 2) Many human ears listening to the same data provides statistics that rank seismograms in order of their likelihood to contain a recording of a triggered event, which is helpful to researchers' analysis of this data as well as to 3) the ability of a deep-learning algorithm to model the boolean identifications or bulk statistics of the analyses, 4) the project has the potential to enhance informal learning because of the online platform that hosts the project, Zooniverse, is available to people of all identities and hosts many other citizen science projects, and 5) it helps prepare our team for diverse post-graduation careers as part of IDEAS, an NRT program at Northwestern University. The events we are asking citizens to help identify via listening are small seismic events such as local earthquakes and tectonic tremor, that occur in response to transient stresses from passing seismic surface waves from a large, distant earthquake. While much research progress has been made in understanding how these events are triggered, there is no reliable deterministic recipe for their occurrence. The aim of our project is to enlist the help of citizens to increase the data set of known triggered seismic events and known absences of triggered events in order to help researchers unravel key aspects of that recipe. A better understanding of triggered seismic events is expected to provide important clues towards a fundamental understanding of all seismic activity, including damaging earthquakes.

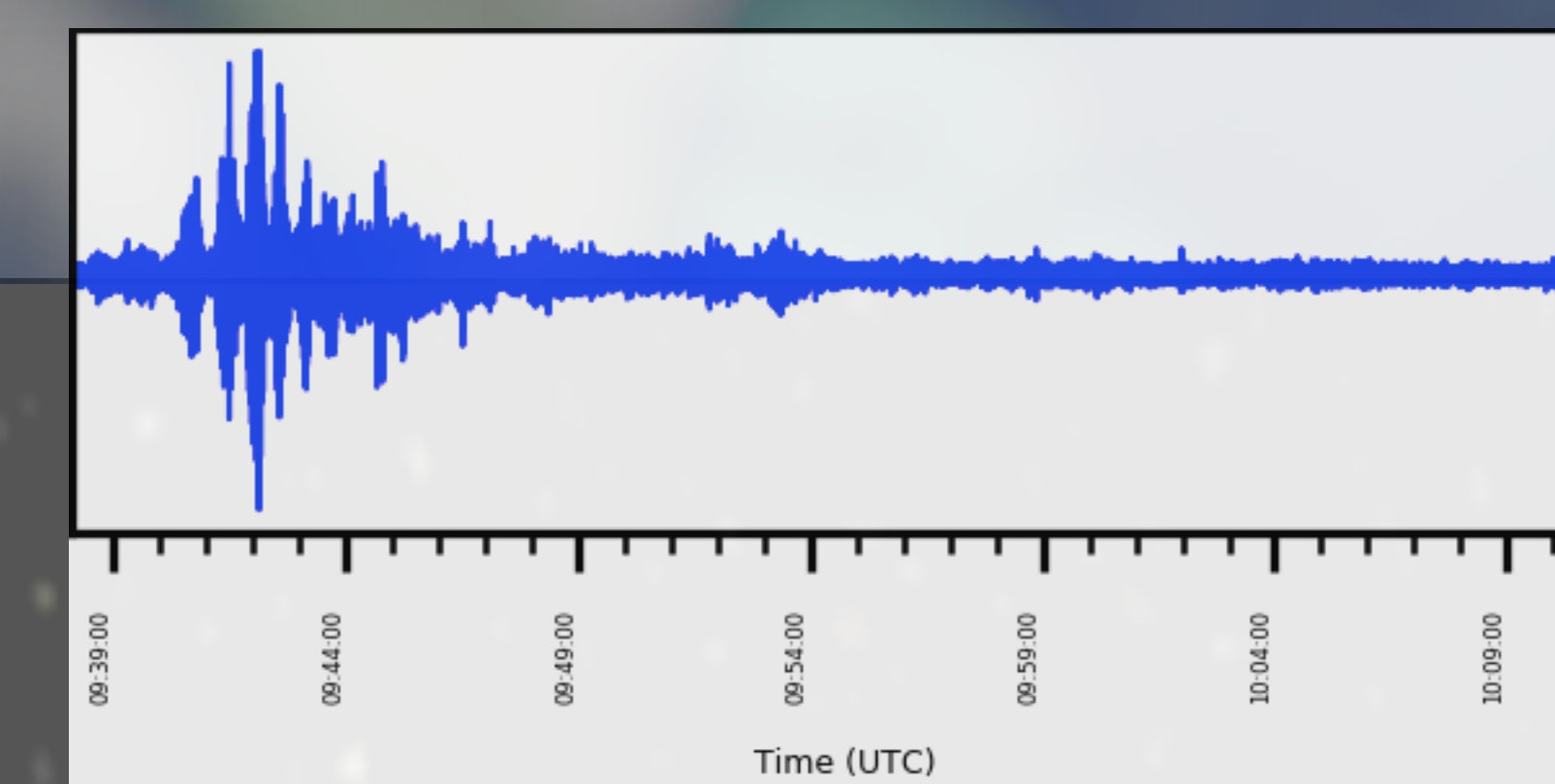
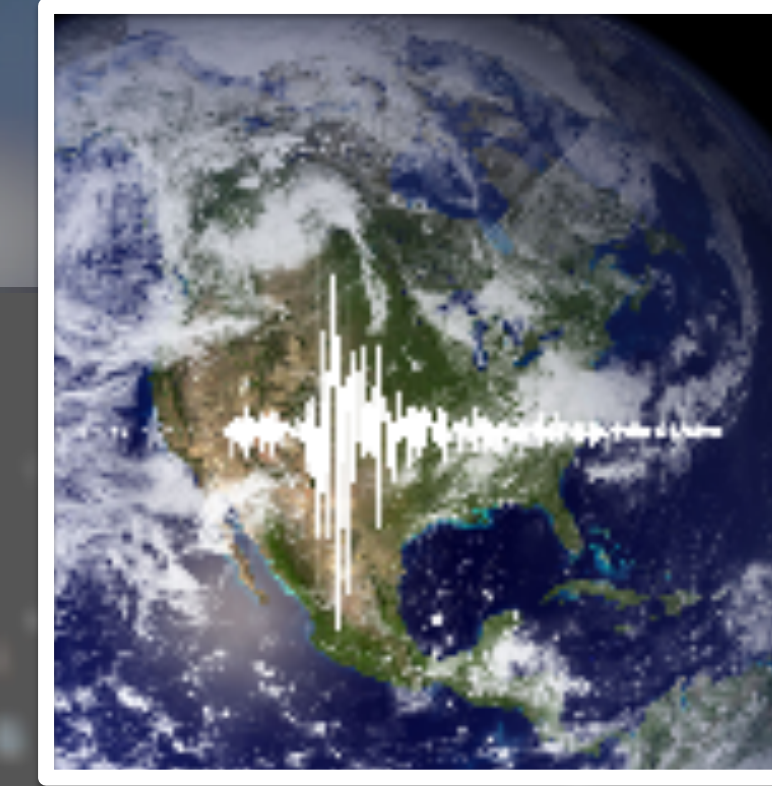
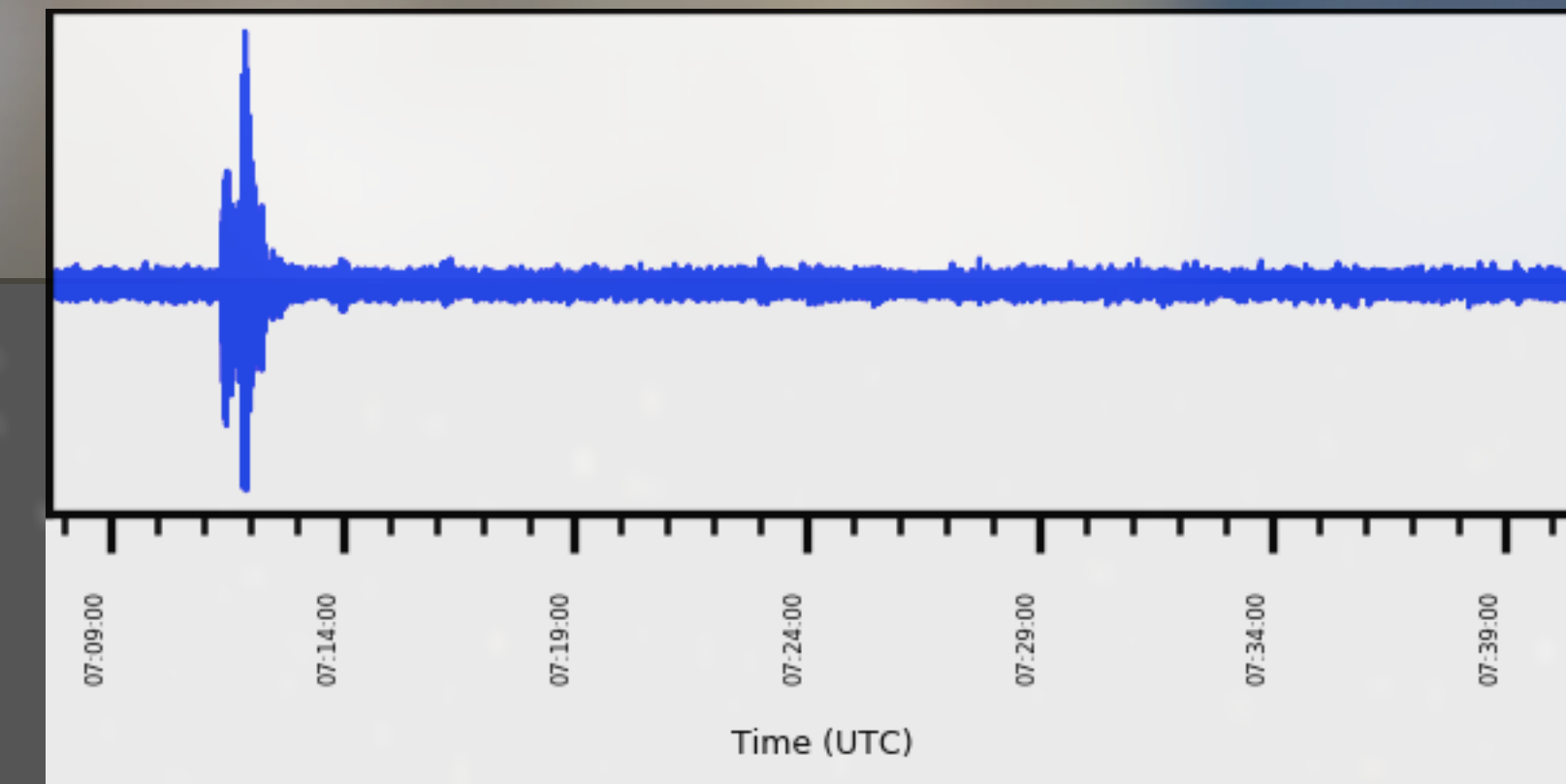
Engaging citizens in the detection of dynamically triggered seismic events

Earthquake Detective

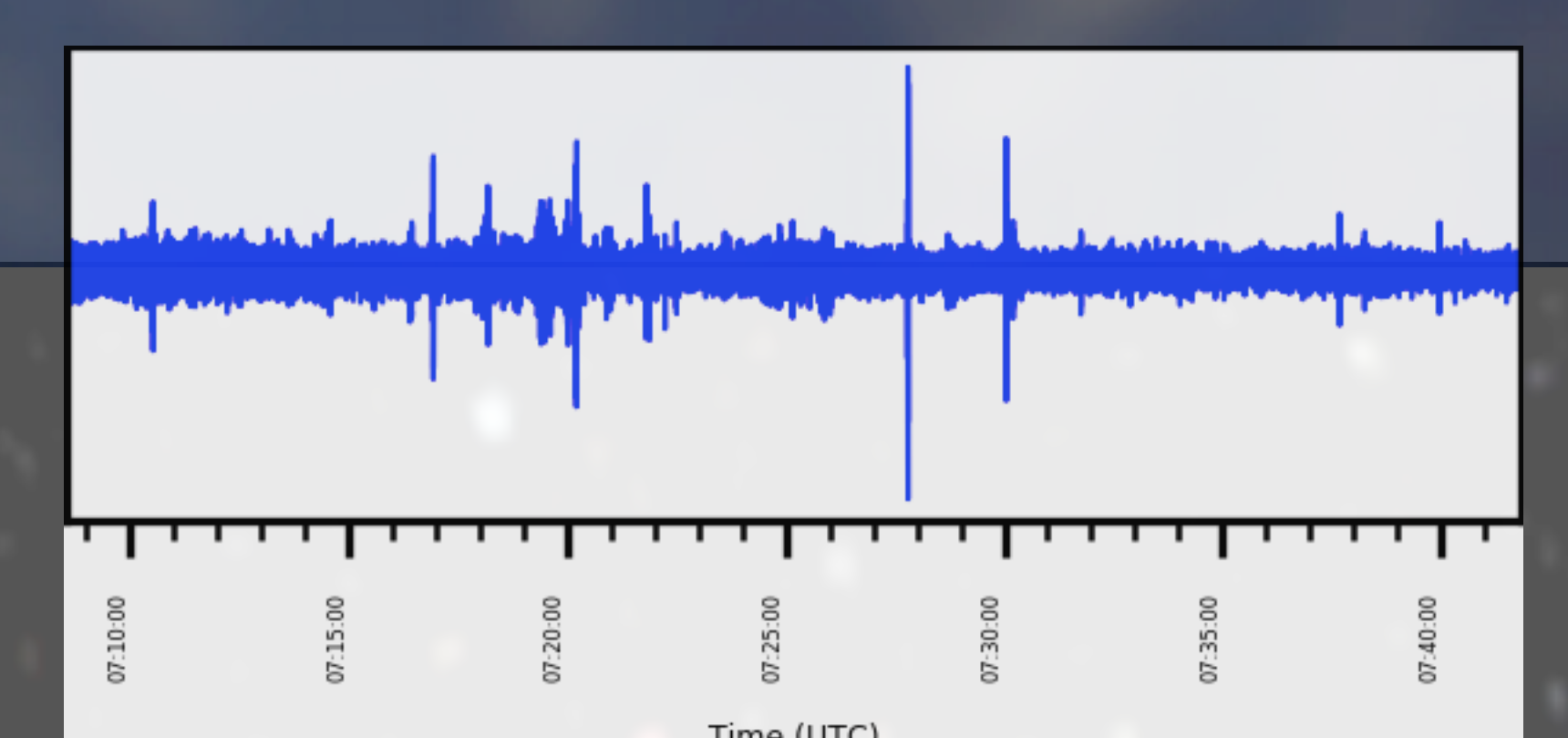
EXPLORE PROJECT 



earthquake
or
noise



tremor
or
unclear



Listen for earthquakes by
speeding up seismic waves to
audible pitches

[Learn more](#)

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<https://www.zooniverse.org/projects/vivitang/earthquake-detective>