

## DDSP Here, There and Everywhere

This workshop focuses on how recent advancements in audio machine learning can analyze and synthesize music in unprecedented ways with respect to a culture's native tuning system.

Most AI models are rooted in Western definitions of melody, harmony, and tuning. For example, training datasets contain mainly Western genres like classical, rock and pop. Models can only output notes on keys of a piano i.e. a 12-tone equal temperament tuning (12-TET). Historically, these built-in assumptions have made it near-impossible to apply music machine learning (ML) to sonic traditions from my home of Thailand, Southeast Asia and many other countries.

Instead of representing music as notes (symbolic AI), we can model music as frequencies (audio AI). Advancements in realtime AI-based pitch detection, make it possible to analyze melodies and inflections measured in Hertz (Hz) from instruments like the Thai Phi with unprecedented accuracy. This pitch data can then be resynthesized into new sounds using technologies I co-developed including Differentiable Digital Signal Processing (DDSP), Tone Transfer and the new realtime VST plugin MAWF.

I will use my recent submission to the AI Song Contest 2022, entitled อสุระเทวะชুমนุช ("Asura Deva Choom Noom") - Enter Demons & Gods, to ground this conversation in terms of technical discussion (neural audio synthesis in browser vs mobile vs desktop cpu) and artistic application to classical music from Thai repertoire.

You can get a better sense of my narrative through my public process document I wrote for the AI Song Contest Submission. <https://lamtharnhantrakul.github.io/enter-demons-and-gods/>