

## **From Ripples and Waves to Tide--Sentence Prosody and Beyond**

Chiu-yu Tseng

Institute of Linguistics, Academia Sinica, Taipei, Taiwan

[cytling@sinica.edu.tw](mailto:cytling@sinica.edu.tw)

<http://phslab.ling.sinica.edu.tw>

Linguistic knowledge is essentially about abstraction. This talk is about the big picture in the speech signal. Chao (1968) illustrated the interaction between Chinese tones and intonation with a visual analogy of ripples and waves whereby the smaller ripples must yield when a larger wave tops over. This talk focuses on why the prosody of a sentence (utterance) when it appears in a discourse context differs drastically from when it is uttered in isolation, and why global prosody beyond the level of sentence is an intrinsic part of naturally occurring speech. It is argued that prosodic chunking and phrasing occur not only at the sentence level, but also at the discourse level. Traces of global prosody found in lower-level speech units are abundant in the speech signal; their seemingly random occurrences can, in fact, be systematically derived. Read and spontaneous L1 Mandarin speech data will be presented to illustrate our proposal that higher-level discourse information takes syntax, phonology and lexicon as sub-level units, and hierarchical contributions add higher units to lower ones to derive multi-phrase global prosody. In the pitch domain, we will show evidence of down-stepping both within and across phrase boundaries, explain why phrasal F0 resets are not uniform, and why some overall F0 trajectories flatten out. In the temporal domain, we will show how speaking rate is adjusted mostly by and across phrases, rather than words, why sometimes pause duration does not occur between boundaries and is thus not the most reliable boundary cue, and why both pre-boundary (phrase-final) lengthening and shortening are found consistently. Furthermore, examination of units larger than the sentence has revealed why prosodic context exhibits both neighborhood linear adjacency and cross-over associative concurrence, and why phrasal prominence must yield to discourse focus. It is argued here that the sentence is not the ultimate unit of speech planning, and that global prosody must take precedence because it more accurately reflects the size and scale of speech planning. In summary, to better understand and realistic speech, looking from the sentence level up or looking top-down from higher levels of prosodic organization may produce the most interesting results.

### **Bio**

**Chiu-yu Tseng** is a Research Fellow at the Institute of Linguistics, Academia Sinica, Taiwan. Trained as a phonetician (Ph.D. in Linguistics, Brown University, 1981), her

collaboration with speech scientists and engineers dates back to 1982, which has led her away from studying limited samples and numbers of speakers toward multiple speakers, larger chunks of more realistic speech, and larger quantities of data (though modest by speech technology community standards). Her research has integrated techniques from engineering and speech technology into acoustic phonetic experimental studies. Her twelve-year investigation of Mandarin Chinese fluent speech prosody from a macro/top-down perspective, taking intonation units larger than the phrase or sentence into consideration, has resulted in the emergence of what she believes to be the defining feature of fluent speech prosody: systematic cross-phrase prosodic association, which constitutes prosodic context. This approach contrasts with analyses of discourse intonation based on patterns of individual phrase intonation. Using quantitative evidence, she has developed a hierarchical prosodic framework, which models the formation of spoken discourse prosody as the accumulation of multi-layered prosodic contributions. She has also been able to tease apart the contributions to cross-phrase prosodic association made by each layer of the prosodic hierarchy for a range of acoustic parameters for which, interestingly, the contributions made by supra-segmental acoustic correlates have been found to vary. As of 2008, she has also begun phonetic comparisons of L1 and L2 English (with a focus on prosody) as a member of AESOP (Asian English Speech cOrpus Project).