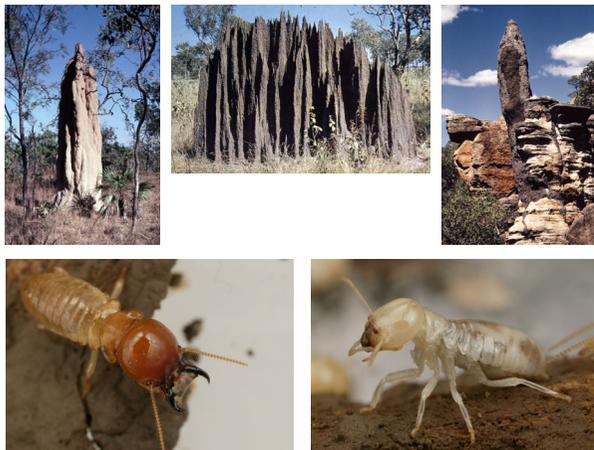# Good Vibrations
Detection and control of termites using vibration sensors

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Why termites?

Termites are highly successful---and costly---pest insects, causing significant damage to wooden structures such as houses. Termite damage has been estimated to cost Australians about **AU$800m/yr**. In the USA alone, damage has been estimated to cost **US$11,000m/yr**.

However, termites are extremely good at manipulating their environment and are very cryptic---they are often not discovered in a home until infestation becomes acute and the structure may be compromised.
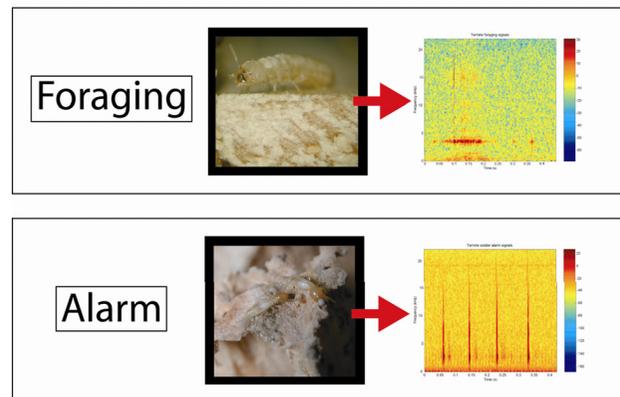

Signal types

Figure 1: Spectrograms (STFT) of vibratory communication signals produced by termites. There are two main types of vibratory communication demonstrated in termites: foraging (upper) and soldier alarm (lower).

Why vibrations?

Termites are generally blind, yet they maintain highly developed social populations. These societies are managed through sophisticated communication systems. Probably the most important communication channel is based on vibration signals.

The most obvious example is the soldier alarm signal: In response to a perceived threat or intrusion, a soldier will strike the substrate with its head. The workers respond by fleeing back to their nest.

Detection and control

By exploiting the vibratory communication channel used by termites, it is possible to manipulate their behaviour.

Recordings of termite vibratory communication are taken and played back to alter their behaviour in order to minimise their negative impact.

This may prove to be an effective alternative or complement to the current most effective termite control method: toxic chemical poisons.
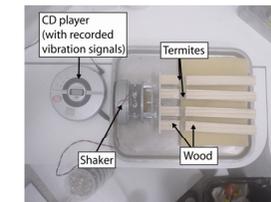

Figure 2: Setup of system used to play back vibrations to foraging termites.

Figure 4: Possible embodiment of a device dedicated to playback vibrations to termites, based on the Gumstix_TM embedded computer platform.
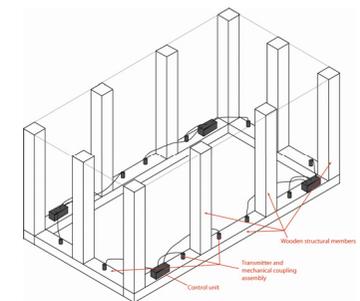

Figure 3: Schematic of a possible embodiment of a device used to repel termites in houses with wooden structural members using playback of termite vibratory communication signals.

Further reading

Inta, R. Evans, T.A., Lai, J.C.S. and Lenz, M.: "What do vibrations have to do with termites' food choice?," *Acoustics Australia*, **35**(3), pp. 73-77 (2007).

Evans, T. A., Lai, J. C. S., Toledano, E., McDowall, L., Rakotonarivo, S., and Lenz, M.: "Termites assess wood size by using vibration signals," *Proc. Natl Acad. Sci. USA* **102**, pp. 3732-3737 (2005).

Evans, T. A., Lenz, M., Lai, J.C. S., and Inta, R.: "Method and system for controlling termites," *WIPO patent number* WO/2007/095693 (2007).

Further information

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