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From bees to computers - nest-site selection in *Apis* spp. as inspiration for optimization algorithms

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Gould Seminar Room (Rm 235) Gould Building (Bldg. 116), Linnaeus Way, ANU



During reproductive swarming and seasonal migration, a honeybee swarm needs to locate and move to a new nest site. Our current knowledge of swarming and nest-site selection in honeybees is based primarily on studies of just one species, *Apis mellifera*. Natural colonies of *A. mellifera* live in tree cavities. The quality of the cavity is often critical to the survival of a swarm. The scouts must search thousands of trees to ensure that they do not settle for a poor cavity when a better one is available.

Recently we started to investigate how swarms of the open-nesting dwarf honeybee *Apis florea* selects a new home. For a cavity-nesting species like *A. mellifera* there is only a limited number of potential nest sites that can be located by a swarm. In contrast, for an open-nesting species like *A. florea* which builds a small nest comprised of a single comb suspended from a twig of a shrub or tree in the open, it seems that there is an abundance of shaded twigs that would be equally suitable for building a nest. Our work showed that the nest-site selection process of *A. florea* and *A. mellifera* are shaped by each species' nest-site requirements.

Contrary to *A. mellifera*, nest-site selection in *A. florea* appears to be more similar to search-space sampling than to a decision-making process. Bees scout the environment for general areas in which potential nest sites are abundant. We therefore proposed that the bees' nest-site selection process can be used as a basis for the development of new bee-inspired optimization algorithms. The first such algorithm has recently been developed.

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