

A Cross-Layer Design for Bee-Inspired Routing Protocols in MANETs

Research problem:

Routing in mobile wireless networks suffers from:

- hidden and exposed terminal problems
- mobility of the network participants
- resource constraints

*Protocols must be **reliable**, **efficient**, and **adaptive** to topological changes.*

Background:

- Internet-inspired routing:
 - proactive: (DSDV), reactive (AODV), and hybrid (ZRP) routing protocols
- Nature-inspired routing:
 - Ant Colony Optimization: AntHocNet
 - hill building: Termite
 - bee-inspired: BeeHive/BeeSensor (**fundamental**)

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Natural honeybee behaviour:

Dr Karl von Frisch (1886-1982) empirically proved that:

- honeybee scouts decide whether to share the food source information (dance)
- the decision is based on factors (quality of food, distance, easiness, etc.)
- the dance affects the hive's interest and the number of recruited foragers

Network protocol engineering:

- map honeybees' behaviour to adaptive routing and packet-switching algorithms
- use bee-agents to monitor wireless links and collect information about transmissions
- use cross-layer design to share information between 'isolated' network layers
- provide routing decisions