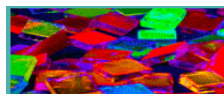


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P13-02 Biomimetic nanoscience inspired by elephants and bees: Water detection with MicroElectroMechanical Systems (MEMS)

Futterknecht O., Macqueen M.O., Karman S., Diah S.Z.M. and [Gebeshuber I.C.](#)

Vienna University of Technology, Aramis Technologies & Universiti Kebangsaan Malaysia

Our interdisciplinary research group comprises physicists, biologists, artists and engineers. We work in the area of biomimetic nanoscience and nanotechnology: We learn from living nature for novel applications in engineering. For inspiration, we go on rainforest expeditions in beautiful Malaysia. If you want to join one of our expeditions, send me an email. For more information, see Prof. Ille's TEDxKL Talk „What is a physicist doing in the jungle? Biomimetics of the rainforest” at <http://www.tinyurl.com/illeted>

Elephants do it, and bees do it, too. They find water. And for this they use cool hi tech methods such as infrasound locators and polarized skylight detectors built into their bodies.

The focus of this study is biomimetic nanotechnology-based concept development for a MEMS sensor array for water detection in desert-like or remote areas. For increased accuracy, abstractions of two biological functions are combined: Polarized skylight-based sensors in honeybees (*Apis mellifera*) and infrasound locators of African elephants (*Loxodonta africana*).

Moisture saturated areas near ground have a small but distinctively different effect on scattering and polarizing light than less moist ones. Bees „see” the natural polarization pattern produced by the sunbeams scattered within the atmosphere, and the slight differences induced by changes in humidity. Elephants detect infrasound produced by underground water reservoirs, and thereby determine the location of underground rivers.



The detection device uses UV reactive MEMS, which are capable to detect the skylight polarization based on the Rayleigh sky model, combined with infrared and infrasound sensors. Application of this technique shall indicate water sources near the ground surface and visualize their exact routes.

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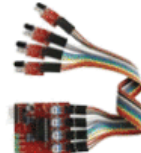
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
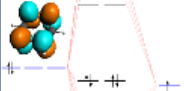
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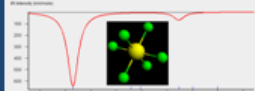


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