

As the crow flies and the beetle rolls: Straight-line orientation from behaviour to neurons

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The seemingly simple act of walking in a straight line involves a complex interplay of various sensory modalities, the motor system, and cognition. This is obvious to anyone who have ever found themselves lost in the desert at night, or in a forest when the sun is high in the sky. A dung beetle released in the same uncharted territory does not move in circles, but holds a chosen bearing until it encounters a suitable spot to bury its ball of dung. The key to the beetle's success lies in their ability to detect and orient via a large repertoire of celestial compass cues, from the bright sun to the weak intensity differences of light provided by the Milky Way.

A beetle's drive to adhere to its set course is so strong that it sticks to it regardless of the costs; over stones, through bushes and grass or in an experimental arena. However, if a beetle is forced to make a new ball, the bearing information is reset in its brain and a new course is set. This unique and robust orientation behaviour, in combination with an accessible brain, make the dung beetle an ideal model system for understanding the fundamental visual and neural processes underlying straight-line orientation.

The presentation provides an overview of recent behavioural, anatomical and physiological results concerning how an insect brain is designed to support the needs to steer straight.

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In-Person **Online**

Max Planck Institute for Neurobiology
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Ludwig-Erhard-Allee 2, 53175 Bonn

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