CRC 1451 - Project INF: AutoGaitA – an innovative open-source Python framework for kinematic analyses of rhythmic motor behaviours across species and experiments.

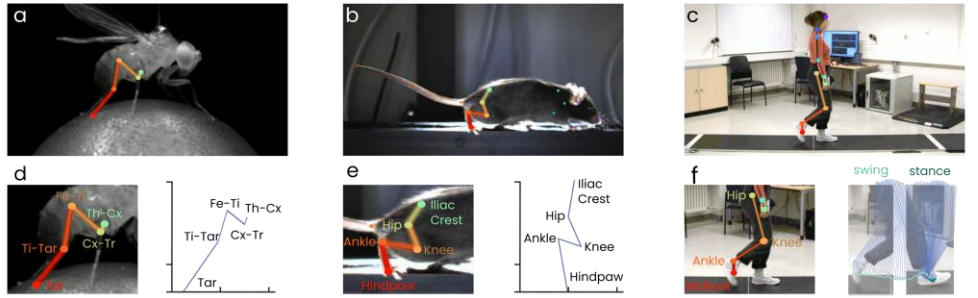
While markerless pose-estimation models like DeepLabCut have made it easy to generate body coordinate time series data in animals and humans, no standardised tool exists for downstream kinematic analysis, complicating movement comparisons. We provide AutoGaitA, a universal tool for kinematic analyses across species and behaviours. Using AutoGaitA to analyse gait data of fruit flies, mice, and humans, we revealed shared and species-specific movement strategies. We showed that ageing was linked to reduced propulsive strength in all three species. In a beam-crossing task, mice adapted to a challenging narrow beam by shortening steps and adjusting posture. Being applicable beyond walking, AutoGaitA will facilitate movement analyses across the field, supporting research into ageing, neurological disorders, and rehabilitation.

Mahan Hosseini is a postdoctoral researcher in projects INF and B03. He focusses on understanding cross-species motor strategies for locomotion and reaching, analysing behavioural and neural data and developing standardised computational tools along the way.

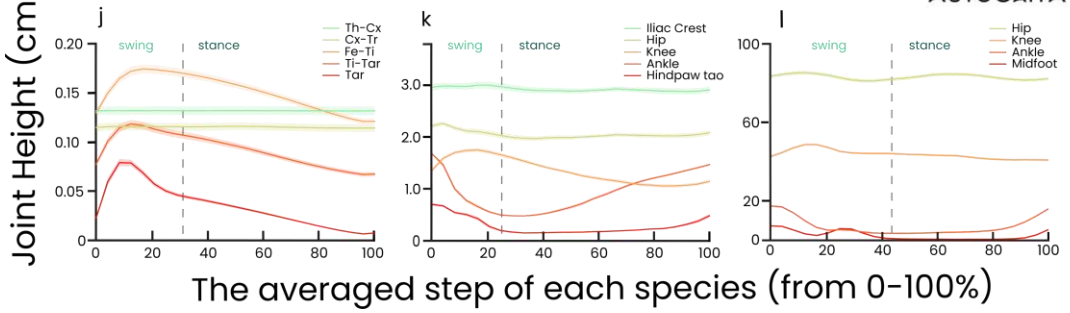
Silvia Daun is a PI in projects INF and B03. She studies how brain regions interact to generate movement and how these dynamics are altered in stroke and other pathological conditions, combining M/EEG, mathematical models and network simulations.

Graziana Gatto is a PI in projects Z02 and A09. She studies how spinal sensory and motor circuits interact to generate and modulate movement, using genetic and viral tools to identify specific neuron populations in the spinal cord and sensory ganglia.

1.Tracking leg coordinates of flies, mice and humans walking



2.Analysing cross-species kinematics with AutoGaitA



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Cross-species identification of conserved and divergent locomotor kinematic strategies using AutoGaitA

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