



## Graduate School Event

# Thesis Defense: Coordination of protrusive forces in immune cell migration

**Patricia Rodrigues (Sixt Group)**

Sixt Group

Host: Florian Schur

Immune responses depend on the coordinated and efficient migration of leukocytes. These cells, which are embedded and tightly confined within tissues, must navigate and traverse diverse and complex three-dimensional environments. Leukocytes adapt their locomotory behavior to the mechanical, geometrical, and biochemical characteristics of their surroundings. In low-density environments, where the pore size of the interstitial matrix allows free passage, these cells position the nucleus directly behind the lamellipodium, the protrusive actin structure that forms the leading front of the cell. In this configuration, they use the nucleus as a gauge to identify the path of least resistance. Here, we show that in high-density environments, where the pore size precludes free passage of the cell body, leukocytes reposition the microtubule-organizing center (MTOC) and associated organelles in front of the nucleus. In this configuration, they use actin structures protruding orthogonally to the direction of migration to open a path for the cell body. We identify two distinct actin populations that serve this purpose at different subcellular localizations. At the leading edge, local indentation of the plasma membrane leads to recruitment of the Wiskott-Aldrich syndrome protein (WASp), which, via Arp2/3, results in the formation of individual actin foci. At the cell body, actin polymerization is triggered by DOCK8, a Cdc42 exchange factor, and results in the formation of a central actin pool. We demonstrate that the central and peripheral actin pools are functionally communicating and that depletion of the central actin pool leads to increased actin accumulation at the cell front, resulting in excessive extension of the leading edge.

**Monday, July 7, 2025 01:00pm - 02:00pm**

Sunstone Bldg / Ground floor / Big Seminar Room A (I23.EG.102) and Zoom



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.

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<https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.

