

SUMMER SEMESTER 2023

RTG 2756 CYTAC SEMINAR SERIES

TUESDAY, APRIL 11,
17:15 IN HS5

CYTAC

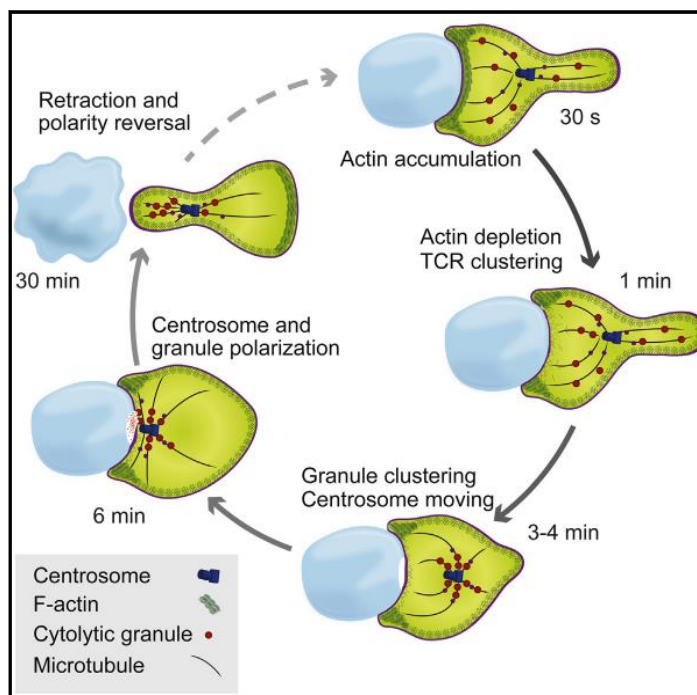
RTG 2756

Prof. Dr. Heiko Rieger

Center for Biophysics & Dep. Theoretical Physics, Saarland University:

Biophysics of Killing – Theory and Experiment

Cytotoxic T lymphocytes and natural killer cells are the main cytotoxic killer cells of the human body to eliminate pathogen-infected or tumorigenic cells. Various processes are involved in a successful killing event: activation of the killer cell, migration and search for the target, formation of a synapse and polarization upon contact with the target, transport of cytotoxic agents towards the synapse, and finally elimination of the target via necrosis or apoptosis. In this talk I will review various biophysical aspects of killing that we studied in collaboration with experimental groups from biology and medicine. Topics include the analysis of search strategies of migrating killer cells; the mechanistic understanding of the molecular motor driven cytoskeleton rotation towards the synapse during polarization; the efficiency of the spatial organization of the cytoskeleton for search problems occurring in intra-cellular cargo transport; and the stochastic analysis of different killing strategies via inducing necrosis or apoptosis.



Sketch of the key sequence of events by which cytotoxic T lymphocytes (T cells) or Natural Killer cells (NK cells) establish an immunological synapse (IS) to kill target cells. From Ritter et al., 2015, *Immunity* 42, 864–876 (graphical abstract).