

# Symposium Anomalous Diffusion in Complex Environments (SYAD)

jointly organized by  
the Biological Physics Division (BP),  
the Dynamics and Statistical Physics Division (DY), and  
the Chemical and Polymer Physics Division (CPP)

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Anomalous diffusion in complex environments has received much attention in recent years. Examples range from active Brownian motion of self-propelled particles, and subdiffusive dynamics in crowded environments, to collective motion and escape problems in anomalous random walks.

Living cells take advantage of the anomalous motion in many ways. While subdiffusion in crowded cytoplasm is beneficial for a variety of cellular functions which depend on the localization of the involved reactants, active motion of motor proteins along cytoskeletal filaments makes long-distance intracellular transport feasible. Cell crawling and migration exhibit other interesting aspects of anomalous motion. The motility of cells and their ability to recognize and react to environmental changes are crucial for an efficient immune response. The motion of self-motile colloidal particles, which use a chemical reaction catalyzed on their surface to swim, is an example of artificial active matter where the directed propulsion subject to fluctuations leads to anomalous diffusion.

Among other topics, collective motion of anomalous random walkers seems to become one of the fascinating directions of current research. Little is known about how the particles may coordinate their motion when they individually perform anomalous random walk. Anomalous motion also complicates the search strategies and escape problems. While first passage problems in confined geometries have been thoroughly investigated for ordinary random walks or combinations of a few simple walks, there is a need to revisit such problems under realistic conditions such as self-propelled motion of tracer particles in cells. The goal of this symposium is to bring together the experts in soft condensed matter and biological systems, and overview the recent advances, ideas and concepts of anomalous transport in theory and experiment.

## Overview of Invited Talks and Sessions

(Lecture room H15)

### Invited Talks

SYAD 1.1	Thu	15:00–15:30	H15	<b>Phenomenology of Collective Chemotaxis in Artificial and Living Active Matter</b> — ●RAMIN GOLESTANIAN
SYAD 1.2	Thu	15:30–16:00	H15	<b>First-passage times of Markovian and non Markovian random walks in confinement</b> — ●RAPHAEL VOITURIEZ
SYAD 1.3	Thu	16:00–16:30	H15	<b>Cytoskeleton organization as an optimized, spatially inhomogeneous intermittent search strategy</b> — ●HEIKO RIEGER, YANNICK SCHRÖDER, KARSTEN SCHWARZ
SYAD 1.4	Thu	16:45–17:15	H15	<b>Ergodicity violation and ageing in living biological cells</b> — ●RALF METZLER
SYAD 1.5	Thu	17:15–17:45	H15	<b>Anomalous diffusion within cells</b> — SARAH KLEIN, ●CECILE APPERT-ROLLAND, LUDGER SANTEN

### Sessions

SYAD 1.1–1.5	Thu	15:00–17:45	H15	<b>Anomalous Diffusion in Complex Environments</b>
SYAD 2.1–2.6	Tue	14:00–15:30	H47	<b>Anomalous Diffusion (Joint Session with DY)</b>
SYAD 3.1–3.6	Thu	11:30–13:00	H45	<b>BP Focus Session: Anomalous Diffusion in Complex Environments</b>