Abstract

Oberwolfach Workshop:

Population Dynamics and Statistical Physics in Synergy

Dates:

6 Mar - 12 Mar 2022 (Code: 2210)

Organizers:

Frank den Hollander, Leiden
Anja Sturm, Göttingen
Anita Winter, Essen

Research at the interface between population dynamics and statistical physics has been developing rapidly. This interface represents a theme of growing interest worldwide. Population dynamics addresses fundamental questions about the cooperative behaviour controlling multi-type interacting populations subject to evolutionary forces in changing environments. Statistical physics is concerned with the macroscopic behaviour of systems with many interacting components, and with the role of emergent behaviour and phase transitions.

Fundamental ideas, methods and techniques have gradually made their way from one field into the other, where they lead to new problems, new solutions and new mathematics. This crossroad has developed into a very active research area over the past 10 years. In the workshop the focus is on common mathematical concepts and tools, and on the surprising new connections that have become available recently. Key topics that will be addressed are:

(1) emergent behaviour, phase transitions and universality,

(2) genealogies, coalescents and networks,

(3) selection, fitness and competition,

(4) dormancy and switching.