



Ben-Gurion University of the Negev
Blaustein Institutes for Desert Research
The Swiss Institute for Dryland Environmental and Energy Research
Alexandre Yersin Department of Solar Energy and Environmental Physics

Title:

**Physics of swarming bacteria. Levy walks, anomalous statistics
and intricate flow regimes**

Speaker:

Dr. Avraham Be'er
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Abstract:

Physicists often model bacteria as simple self-propelled rods, perhaps small inanimate or inert micro swimmers that obey the physical rules of small Reynolds numbers. But the dynamics of swarming bacteria, where thousands of cells are moving collectively, forming long-standing whirls and jets, is much more intricate than expected. As a result, even advanced theories may fall short in explaining some of the experimental observations.

When bacteria move collectively their dynamics is known to be dictated by several mechanisms such as long-range hydrodynamic interactions and short-range repulsive steric forces. But other questions are still open which include for instance the motion of individuals inside the swarm.

In the talk I will describe the experiments we perform in details, and present recent results we have obtained in the last years. For instance, I will show results for swarming bacteria that exhibit Levy walk, anomalous statistics with a non-Gaussian velocity distribution and complex spatiotemporal decays of the correlation functions, and puzzled cell trajectories that do not move with the collective flow.

Tuesday, January 3, 2017, 11:00
Lecture room, Physics Building (ground floor)