

Research Workshop of the
Israel Science Foundation

COLLECTIVE DYNAMICS IN MICROORGANISMS AND CELLULAR SYSTEMS

In Memory of
Eshel Ben-Jacob

22-26 May, 2016

George Evens Family Auditorium
Sede Boqer Campus

Sunday May 22nd

16:00-18:30 Shuttle from Tel Aviv University to Hotel
in Mitzpe Ramon
18:30-21:00 Registration at the Lobby

Monday May 23rd

9:00-9:30 Shuttle to Sde Boker
9:45-10:05 Opening – Avraham Be'er
and Rasika Harshey
10:05-10:15 Welcome by Prof. Boris Zaltzman –
Dean of BIDR

Session I

Chairperson, Hartmut Löwen
10:15-10:55 Igor Aranson
Model of substrate-based collective
cell motility
11:00-11:40 Eric Clément
Bacteria in a flow
11:45-12:15 Coffee break
12:15-12:55 Douglas Weibel
Bacterial cell mechanics and motility
13:00-13:40 Yilin Wu
Cohesive swimming of bacteria
in two dimensions
13:45-15:00 Lunch

Session II

Chairperson, Douglas Weibel
15:00-15:40 Rasika Harshey
Success in a swarm
15:45-16:25 Ilana Kolodkin
A matrix protein acts simultaneously
to induce structure and to maintain a
motile subpopulation within biofilms
16:30-17:00 Coffee break
17:00-17:40 Colin Ingham
How Flavobacteria organize to create
structural colour
17:45-18:25 Yael Helman
The effect of interspecies microbial
interactions on surface motility
18:45-19:15 Shuttle to the Hotel

Tuesday May 24th

9:00-9:30 Shuttle to Sde Boker

Session III

Chairperson, Igor Aranson
9:45-10:25 Herbert Levine
Contact inhibition and collective
cell motility
10:30-11:10 Hartmut Löwen
Collective dynamics in artificial
and biological microswimmers
11:15-11:45 Coffee break

11:45-12:25 Markus Bär
Modeling collective motion and pattern
formation of self-propelled rods and
application to myxobacteria
12:30-13:10 Stefan Otte
Speed fluctuations enhance the diffusion
of bacteria swimming near surfaces
13:15-14:45 Lunch

Session IV

Chairperson, Rasika Harshey
14:45-15:25 Andrey Sokolov
Expulsion of swimming bacteria
by a vortical flow
15:30-16:10 Sigal Ben-Yehuda
Early developmental program shapes
colony morphology in bacteria
16:15-16:45 Coffee break
16:45-17:25 Avigdor Eldar
Social evolution of bacterial
quorum sensing
17:30-18:30 Ignite Talks
18:30-21:00 A full moon outdoor barbeque
21:15-21:45 Shuttle to the hotel

Wednesday May 25th

8:30-9:00 Shuttle to Sde Boker

Session V

Chairperson, Herbert Levine
9:15-9:55 Nir Gov
An Adaptive gravity model for
interactions in insect swarms
10:00-10:40 Ritankar Majumdar
Chemotactic gradient amplification
through the release of extracellular
vesicles during neutrophil chemotaxis
10:45-11:00 Coffee break
11:00-11:40 Lev Tsimring
Synchronization of synthetic
gene oscillators
11:45-12:25 Luca Giuggioli
Collective dynamics of territorial animals
12:30-13:00 Lunch

Session VI

Chairperson, Avraham Be'er
13:00-13:40 E-L Florin
Do they swim or crawl?: The surface
motility of *Paenibacillus dendritiformis*
C-type
13:45-14:25 Anne Bernheim
The dynamics of buckling
of self-organizing contractile sheets
14:30-15:30 Shuttle to the hotel and free time
15:30-20:00 Jeep Tour (and snacks),
Dinner in the hotel

Thursday May 26th

8:30-9:00 Shuttle to Sde Boker

Session VII

Chairperson, Markus Bär
9:15-9:55 Gil Ariel
Lévy walks in swarming bacteria
Avraham Be'er
Anomalous statistics during swarming
10:00-10:40 Sebastian Heidenreich
Fluid dynamics of dense microswimmer
suspensions
10:45-11:15 Coffee break
11:15-11:55 Ilan Tsarfaty
Signal transduction regulating tumor cell
morpho-kinetic plasticity and metastasis
12:00-12:40 Inbal Hecht
Individualism and cooperativity in
metastasizing cancer cells
12:45-13:30 Lunch

Session VIII

Chairperson, Gil Ariel
13:30-14:10 Zeev Ronen
Microbial populations in ion exchange
bioreactors are affected by opposing
fluxes of electron donors and acceptors
14:15-14:55 Ehud Meron
From patterns to function in living
systems: dryland ecosystems
as a case study
15:00-15:15 Closing - Gil Ariel
16:00 Shuttle to Airport and Tel Aviv University

Short Talks and Posters

Nitzan Razin Modeling the active motion
of vesicles in the oocyte
Renan Gross Searching for phase transitions
in rod-shaped bacteria by population tracing
Gilad Book Mathematical models of cooperation
between bacteria in an antibiotic environment
Dalit Roth Explorers and builders, working together
to build a bacterial colony
Marina Sidortsov Collective dynamics of smooth-
swimming bacteria
Bella Ilkanaiv The role of cell aspect ratio in collective
bacterial motion
Orly Schwartz Three-dimensional analyses of swarming
bacteria in a multi-layered colony
Nitai Steinberg A motile cell subpopulation keeps
bacterial biofilms flexible
Ishay Ben-Zion Positive Feedbacks Promote the
Evolutionary Stability of Cooperative Behaviors
Roni Oshri Social Interactions during swarming
of *Pseudomonas aeruginosa*
Jonathan Partridge c-di-GMP Mediated Control
of the Flagellar Motor

<http://swarming-in-israel.weebly.com>

Scientific and Organizing Committee

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The Jacob Blaustein Center for Scientific Cooperation
The Jacob Blaustein Institutes for Desert Research
Ben-Gurion University of the Negev

