International Workshop
21 - 25 October 2019

Fluid Physics of Life

PROGRAM

Scientific coordinators:
Karen Alim • Max Planck Institute for Dynamics and Self-Organization, Göttingen &
Technical University of Munich, Germany
Eberhard Bodenschatz • Max Planck Institute for Dynamics and Self-Organization,
Göttingen, Germany
Gerhard Gompper • Forschungszentrum Jülich, Germany

Organisation:
Maria Voigt • MPIPKS, Dresden, Germany
The program will be continuously updated during the event. This version was printed on October 18, 2019.
Monday, 21 October

10:15 - 10:30  Frank Jülicher (director MPIPKS) and scientific coordinators
Opening

Flows on different scales

Chair: Eberhard Bodenschatz

10:30 - 11:30  Ramin Golestanian (Max Planck Institute for Dynamics and Self-Organization)
A classical analog of Bose-Einstein condensation in active matter

11:30 - 12:30  Frank Jülicher
(Max Planck Institute for the Physics of Complex Systems)
Electrohydraulics of tissues

12:30 - 13:30  Lunch break

13:30 - 16:00  Discussions
(available discussion rooms: seminar room 3, 2 A 1, 1 B 1 and 2 B 1)

16:00 - 16:30  Coffee break
Program

fplife19-Colloquium chair: Steffen Rulands (MPIPKS)

16:30 - 17:30
fplife19-Colloquium: Karen Alim
(Max Planck Institute for Dynamics and Self-Organization & Technical University of Munich)
Fluid flows shaping morphology

17:30 - 18:00
Discussions

18:00 - 19:00
Welcome dinner

Chair: Masaki Sano

19:00 - 19:30
Dmitry Fedosov (Forschungszentrum Jülich)
Formation and dissociation of VWF-platelet aggregates in blood flow

19:30 - 20:00
Maciej Lisicki (University of Warsaw)
Swimming eukaryotic microorganisms exhibit a universal speed distribution

20:00 - 21:00
Michael Wilczek (Max Planck Institute for Dynamics and Self-Organization)
Self-organization in active fluids
Tuesday, 22 October

**Flow tissue interactions**

*Chair: Karen Alim*

09:00 - 10:00  **Masaki Sano** (The University of Tokyo & Shanghai Jiao Tong University)
Toward Active Hydrodynamics for Extensile Tissue Dynamics

10:00 - 10:30  Coffee break

10:30 - 11:30  **Regina Faubel** (University of Pittsburgh)
The Ciliary Logistic Network - a transport system based on fluid dynamics

11:30 - 12:30  **Douglas H. Kelley** (University of Rochester)
The fluid physics of brain waste removal

12:30 - 13:30  Lunch break

13:30 - 16:00  Discussions
*(available discussion rooms: seminar room 3, 2 A 1, 1 B 1 and 2 B 1)*

16:00 - 16:30  Coffee break

16:30 - 18:00  Poster session I
*(focus on odd poster numbers)*

18:00 - 19:00  Dinner
Program

Chair: Michael Shelley

19:00 - 19:30  
**Francesco Boselli** (University of Cambridge)  
Fluid dynamics and development of orientational polarity in multiciliated tissues

19:30 - 20:00  
**Stephan Gekle** (University of Bayreuth)  
Blood platelet formation - a biological Rayleigh-Plateau instability

20:00 - 21:00  
**Nathalie Jurisch-Yaksi** (Norwegian University of Science and Technology)  
The function of motile-cilia driven flow in the nervous system
Wednesday, 23 October

**Flow within the cell**

*Chair: Raymond E. Goldstein*

09:00 - 10:00  **Moritz Kreysing** (Max Planck Institute for Molecular Cell Biology and Genetics)
Light controlled cytoplasmic transport to probe cellular organization

10:00 - 10:10  Group photo
(to be published on the event’s web page)

10:10 - 10:30  Coffee break

10:30 - 11:30  **Alexandra Zidovska** (New York University - Center for Soft Matter Research)
The “self-stirred genome”: dynamics, flows and rheology

11:30 - 12:30  **Michael Shelley**
(Simons Foundation - Flatiron Institute)
Self-Organization and Mechanics in the Cell

12:30 - 13:30  Lunch break

13:30 - 16:00  Discussions
*(available discussion rooms: seminar room 3, 2 A 1, 1 B 1 and 2 B 1)*

16:00 - 16:30  Coffee break
Program

Chair: Gerhard Gompper

16:30 - 17:00  Thomas Fai (Brandeis University Waltham)
Fluid dynamics of vesicular transport in dendritic spine

17:00 - 17:30  Isabella Guido (Max Planck Institute for Dynamics and Self-Organization)
Spontaneously oscillating synthetic cilia

17:30 - 18:00  Benjamin M. Friedrich (Technical University Dresden - Center for Advancing Electronics)
Stability and noise of metachronal waves in cilia carpets

18:15  Departure for downtown Dresden by tram
(meeting point: reception of the MPIPKS, main building)

19:00 - 20:30  Workshop dinner at the restaurant ‘Gasthaus am Neumarkt’, An der Frauenkirche 13, Dresden
(Tel.: +49 351 323 67 210)
Thursday, 24 October

Transport and signaling

Chair: Marcus Roper

09:00 - 10:00  Knut Drescher (Max Planck Institute for Terrestrial Microbiology)
Dynamics of Bacterial Collective Behavior

10:00 - 10:30  Coffee break

10:30 - 11:30  Jörn Dunkel (Massachusetts Institute of Technology)
Spontaneous symmetry breaking in active fluids

11:30 - 12:30  Kathleen Stebe (University of Pennsylvania, Philadelphia)
Bacteria as Active Surface Agents

12:30 - 13:30  Lunch break

13:00 - 16:00  Discussions
(available discussion rooms: seminar room 3, 2 A 1, 1 B 1 and 2 B 1)

16:00 - 16:30  Coffee break

16:30 - 18:00  Poster session II
(focus on even poster numbers)

18:00 - 19:00  Dinner
Chair: Alexandra Zidovska

19:00 - 19:30  Jorge Arrieta  
(Instituto Mediterráneo de Estudios Avanzados)  
Light-Control of Localised Photo-Bio-Convection

19:30 - 20:00  Eleonora Secchi  (ETH Zurich)  
Fluid flow and motility control initial bacterial colonization on curved surfaces

20:00 - 21:00  Arndt Siekmann  
(University of Pennsylvania, Philadelphia)  
The role of blood flow in building hierarchically patterned blood vessel networks
**Friday, 25 October**

**Flow biofilm interactions**

*Chair: Kathleen Stebe*

09:00 - 10:00  **Raymond E. Goldstein** (University of Cambridge)  
Flow-induced dinoflagellate bioluminescence at the single cell level

10:00 - 10:30  **Coffee break**

10:30 - 11:30  **Marcus Roper**  
(University of California, Los Angeles)  
Can a shear stress set point produce stable microvascular networks?

11:30 - 12:30  **Kaare H. Jensen**  
(Technical University of Denmark)  
Controlling intercellular flow through mechano-sensitive plasmodesmata nanopores in plants

12:30 - 13:30  **Lunch break**

13:30 - 14:30  **Discussions**  
*(available discussion rooms: seminar room 3, 2 A 1, 1 B 1 and 2 B 1)*

14:30 - 15:00  **Closing and departure**

15:00 - 16:00  **Informal discussions**