

The Biophysics of Motile Cilia - from Structure to Function

830. WE-Heraeus-Seminar

30 March - 02 April 2025

at the Physikzentrum Bad Honnef, Germany

**WILHELM UND ELSE
HERAEUS-STIFTUNG**



Program

Sunday, 30 March 2025

14:30 – 19:30	Registration	
16:45-17:00	Benjamin Friedrich, Veikko Geyer, Timo Strünker	Welcoming Note
	<i>Ultrastructure of cilia (chair: Timo Strünker)</i>	
17:00-17:45	Gaia Pigino	Towards a mechanistic understanding of ciliary transport and assembly
17:45-18:30	Tzviya Zeev Ben Mordehai	Molecular specialisation of the sperm flagella
18:30-19:30	<i>BUFFET SUPPER and informal get-together</i>	
	<i>Keynote lecture (chair: Benjamin Friedrich)</i>	
19:30-20:30	Manu Prakash	tba
20:30-22:00	<i>Get-together</i>	

Program

Monday, 31 March 2025

07:45	<i>BREAKFAST</i>	
08:45– 09:00	Scientific Organizers	Video “About the Wilhelm and Else Heraeus Foundation”
	<i>Motor dynamics and ciliary beat (chair: Veikko Geyer)</i>	
09:00 - 09:45	Alan Brown	Structural studies of axonemal dyneins
09:45 – 10:30	Antonio de Simone	Recent results on the modeling of the flagellar beat
10:30 –10:35	CONFERENCE PHOTO (in front of the lecture hall)	
10.35-11:00	<i>COFFEE BREAK</i>	
11:00-12:30	<i>Data blitz</i>	
	Cynthia He	ARL3 GTPases facilitate ODA16 unloading from IFT in motile cilia
	Tomer Avidor-Reiss	The Centriolar Rod Protein POC1B Controls Sperm Tail Beating and Head Kinking
	Ron Orbach	Unraveling the Mechanisms of Microtubule Stabilization in Ciliary Axonemes
	Louis Woodhams	Internal forces, axoneme distortion, and dynamic instability in multi-filament models of the ciliary axoneme
	Andrej Vilfan	Hydrodynamic synchronization of cilia in finite systems
12:30-14:00	<i>LUNCH</i>	

Program

Monday, 31 March 2025

Modeling of motor control (chair: Jonathon Howard)

14:00 - 14:45	Jonathon Howard	Mechanics of Ciliary motility
14:45 - 15:30	Hermes Gadelha	Motor Organization in Axonemal Machines: A Story Far from Over
15:30 – 16:00	<i>COFFEE BREAK</i>	
16:00 -17:30	Poster blitz (one-minute oral presentations of poster presentations)	
17:30 – 18:30	Poster session	
18:30 – 19:30	<i>DINNER</i>	
19:30-21:00	Poster session	

Program

Tuesday, 01 April 2025

08:00 *BREAKFAST*

3D ciliary waveforms (chair: Gaia Pigino)

09:00 – 09:45 Kirsty Wan **Origins of diaplectic metachronal waves**

09:45 – 10:30 Laurence Wilson **Holographic imaging of the flagellar waveform of *Chlamydomonas reinhardtii***

10:30 – 11:00 *COFFEE BREAK*

Ciliary synchronization (chair: Nathalie Jurisch-Yaksi)

11:00 – 11:45 Pietro Cicuta **Fluid flows within and close to ciliated epithelia**

11:45 – 12:30 Jana Nawroth **Structure-function relationships of human airway mucociliary clearance**

12:30 – 14:00 *LUNCH*

Cilia signalling and navigation (chair: Benjamin Kaupp)

14:00 – 14:45 Gaspar Jekely **Multiciliated sensory cells mediate hydrostatic pressure sensation in zooplankton**

14:45 – 15:30 Alan Tsang **Phototactic responses of ciliary microorganisms**

15:30 – 16:00 *COFFEE BREAK*

Cilia mechano-sensing (chair: Daniel Tam)

16:00 – 16:45 Julien Vermot **Cilia motility, mechanosensitivity and left-right specification in vertebrate embryos**

Program

Tuesday, 01 April 2025

16:45 – 17:30 Oliver Bäumchen **Light-Switchable Ciliary Adhesion to Surfaces**

Keynote lecture (chair: Veikko Geyer)

17:30 – 18:30 David Mitchell **Why and how did 9+2 cilia evolve?**

18:30 – 18:45 **Poster Prizes**

18:45 **HERAEUS DINNER**
(social event with cold & warm buffet with complimentary drinks)

Wednesday, 02 April 2025

07:30 – 08:30 **BREAKFAST**

Tools to study cilia dynamics (chair: Jean-Ju Chung)

08:30 – 09:15 Jan Hansen **Studying dynamics and heterogeneity of cilia**

09:15 -10:00 ***Data Blitz***

Martin Striegler **Twist-torsion coupling in beating axonemes**

Cesar O. Pacherres **Effects of environmental stress on the cilia beating frequency and vortex formation in corals**

10:00 – 10:30 **COFFEE BREAK**

10:30 – 11:30 ***Data blitz***

Emma van Grinsven **Basal body blueprint: Expansion microscopy of microtubules in multiciliated cells**

Program

Wednesday, 02 April 2025

Jean-Ju Chung

CATSPER ϵ extracellular domains are essential for sperm CatSper channel assembly and activity modulation

Jane Chui

Synchronisation of flagella in cellular carpets derived from *Volvox carteri*

Ciliopathies (chair: Timo Strünker)

11:30 – 12:15

Nathalie Jurisch-Yaksi

The role of cilia and ependymal cells in cerebrospinal fluid dynamics

12:15 – 13:00

Melanie Balbach

Soluble adenylate cyclase – Sperm metabolic sensor and contraceptive target?

13:00 – 14:30

LUNCH

End of the seminar and departure

For participants leaving on Thursday a self-service breakfast will be provided on Thursday morning.