

**Coherent Structures in
Multiphysics
Flows:
Modelling, Control, and
Interpretation**

1 – 3 July 2026

Berlin, Germany



Organizers

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Prof. Peter Schmid	Dr. Sebastian Schmitter
Prof. Taraneh Sayadi	Prof. Miguel Alfonso Mendez
Prof. Daniel Rodriguez	Dr. Olivier Marquet
Prof. Lutz Lesshafft	Prof. Santosh Hemchandra
Prof. Georgios Rigas	Dr. Petronio Nogueira

Host Institutes



Conference Venue

The colloquium will take place in the Charlottenburg district of Berlin, Germany, adjacent to the campus of Technische Universität Berlin.

The scientific sessions will be held at the facilities of the Physikalisch-Technische Bundesanstalt (PTB) campus (Abbestraße 12, 10587 Berlin), located just next to the TU Berlin campus.

Access from Public Transport

The PTB's main campus is easy to reach using Berlin's excellent public transport system:

-  **U-Bahn Ernst-Reuter-Platz** (U2 line) – ~ 10 minutes walk to conference venue.
-  **S-Bahn Zoologischer Garten** – ~ 10 minutes walk to campus.
-  **Bus connections** – lines M45, 245, X9 stop directly at or near the campus
-  **From Berlin Central Station (Hbf)** – ~ 20 minutes by S-Bahn (S3, S5, S7, S9) to Zoologischer Garten.
-  **From Berlin Brandenburg Airport (BER)** – ~ 1 hour by regional train or S-Bahn to Zoologischer Garten. A taxi/Uber/Bolt from the airport to the city center costs around 60€.

 **Travel tip:** We recommend using the official BVG app (available in English and German) for buying tickets, and travel updates in Berlin.

The map below shows the campus layout and nearby stations for your orientation:



Social Events



Reception at Schleusenkrug (1 July)



Dinner at Spreefeld Bootshaus (2 July)

Reception — Wednesday, 1 July 2026

At **19:00** you are warmly invited to the **Schleusenkrug**, a traditional beer garden right next to the TU Berlin campus and on the edge of the Tiergarten park next to a canal lock. Join us for a relaxed evening of food and drinks. ♥ Location

Boat Trip and Dinner — Thursday, 2 July 2026

As our main social event we have organised a **private boat trip** along the River Spree. We board near the conference venue and cruise eastbound past the governmental district and the historic centre of Berlin. We arrive close to the dinner location, the “**Spreefeld Bootshaus**”, a former border-police boat house right on the river front.

After the **last talk ends at 17:00**, we leave the conference venue **together at 17:10** and walk to the jetty (approx. 20 min). ♥ Walking route The **meeting point** is the **jetty at Caprivibrücke** (Iburger Ufer 1, 10587 Berlin) at **17:35**. Please be on time — the **boat departs at 17:45!**

On board you can enjoy **one complimentary drink**: the paper ticket from registration serves as both your **entry ticket** and **drink voucher**. Additional drinks can be purchased on board - **cash only**. The group will be split between two boats, the larger “*Golda*” and the smaller “*Jimmy*”. If it’s sunny and hot, please bring a water bottle, a hat and sun screen.

The boat arrives at **Schillingbrücke**, from where we walk together (approx. 5 min) to the dinner location at Wilhelmine-Gemberg-Weg 14, 10179 Berlin. ♥ Walking route **Dinner begins at 20:00** and ends at **24:00**. Please note that the venue is in a residential area, so we kindly ask you not to stay and chat in front of it. If you would like to continue the evening, we are happy to recommend bars nearby.

Getting back

After midnight you are free to make your own way back. Please keep in mind that public transport stops running after around 00:45. We recommend the following options:

🚆 **S-Bahn** – approx. 12-minute walk to **Ostbahnhof**. The last S-Bahn departs Ostbahnhof at **01:18** westbound and **01:29** eastbound. ♥ Walking route

🚇 **U-Bahn** – the U8 line is reachable at **U Heinrich-Heine-Straße** (approx. 11-minute walk) or **S+U Jannowitzbrücke** (approx. 17-minute walk). The last U8 departs Heinrich-Heine-Straße at **00:43** southbound and **00:45** northbound.

🚗 **Taxi, Uber or Bolt** – readily available throughout the night.

Conference Program

Wednesday, 1 July 2026

Time	Presenter	Title	#	
08:45	K. Oberleithner & P. Jordan	<i>Welcome and opening remarks</i>	–	
Session 1 — Resolvent and Stability Frameworks for Turbulent Coherent Structures				
09:00	C. Wang	Prediction of coherent structures in turbulent flames from sparse mean flow measurements: data assimilation and resolvent analysis	13	<i>L. Lesshaft</i>
09:15	A. Franchini	Mean resolvent analysis of a stochastic axisymmetric jet	16	
09:30	C. Douglas	On the role of eddy viscosity dynamics in mean-flow stability and resolvent analysis	17	
09:45	Z. Zhang	Strongly and weakly nonlinear dynamics of three-dimensional coherent structures in a round jet	30	
10:00	R. Peron	Resolvent Analysis of Assimilated Mean Flow for Capturing Airfoil's Tonal Fluctuations	36	
10:15	M. P. Ribeiro	Resolvent Analysis and Spectral Proper Orthogonal Decomposition of rotating turbulent channel flows	54	
10:30	A. Villié	Linear amplification mechanisms in axisymmetric stenotic flows: from LES to MRI data	67	
10:45		<i>Coffee break</i>	<i>10:45–11:15</i>	
Session 2 — Coherent Structures and Causality in Wall Turbulence				
11:15	P. Chen	Causal significance of quadrant structures in channel turbulence	06	<i>S. Symon</i>
11:30	Z. Hao	Restarts and sustainment of bursts in turbulence in minimal channels	12	
11:45	A. Schulz	Dynamic response of the turbulent boundary layer to an unsteady boundary condition	34	
12:00	K. Schäfer	On the Meandering of Convective Rolls in Turbulent Channel Flow over Streamwise Ridges	48	
12:15	G. Hasanuzzaman	Influence of uniform blowing on turbulent boundary layers: POD analysis of large scale structures	51	
12:30		<i>Lunch break</i>	<i>12:30–14:00</i>	
Session 3 — Coherent Structures in Time-Varying and Non-Stationary Flows				
14:00	R. Klopsch	Wake interaction between porous discs: linear nowcasting and forecasting from sparse experimental data	49	<i>O. Schmidt</i>
14:15	I. Padilla-Montero	Detecting non-stationary dynamics in supersonic twin jets by modal decomposition of high-speed schlieren images	20	
14:30	M. Raiola	Wavepackets eduction in turbulent jets using Hilbert POD	32	
14:45	A. Gesla	Vortex breakdown of a swirling jet	31	
15:00	L. Franceschini	Identification and reconstruction of high-frequency fluctuations evolving on a low-frequency base-flow	57	
15:15	N. Puff	Lifecycle Statistics of Cavitating Structures	61	
15:30		<i>Coffee break</i>	<i>15:30–16:00</i>	
16:00	Petronio Nogueira & Olivier Marquet	Round Table 1 — How far can reduced-order modelling take us?		
19:00		<i>Reception</i>	<i>19:00–21:00</i>	

Thursday, 2 July 2026

Time	Presenter	Title	#		
Session 4 — Wave Dynamics and Coherent Structures in Compressible Flows					
09:00	F. Pagaud	Chirality of azimuthal aeroacoustic instability in axisymmetric cavity	08	P. Nogueira	
09:15	C. Bogey	Numerical modelling of acoustic waves guided in a jet	09		
09:30	G. Lu	Global stability analysis of twin planar jets	14		
09:45	J.-C. Robinet	Linear PSE modelling of wavepackets in installed jets	25		
10:00	T. Bergeon	Global linear stability and resolvent analyses of over-expanded nozzle	46		
10:15	P. Jordan	Jet–edge interaction tones: a stochastically forced Stuart–Landau Oscillator?	65		
10:30	S. Demange	A low-order model of the coherent structures driving airfoil broadband trailing-edge noise	66		
10:45	Coffee break		10:45–11:15		
Session 5 — Coherent Structures in Fluid-Structure and Multiphase Systems					
11:15	J. Sierra-Ausin	Exceptional points in flutter and Vortex-Induced-Vibrations	37	O. Marquet	
11:30	E. Martini	Effects of flexibility in airfoil self-noise	64		
11:45	Y. Goodwin	Space-time resolved coherent structures of LEVs on a 6-axis robotic flapper	27		
12:00	M. Chiatto	On the analysis of vortex and particles dynamics in a square microfluidic T-junction	33		
12:15	E. Pratschke	Coherent structures in multirotor hover flight	35		
12:30	C. Cardinale	Vortex instabilities leading to turbulence in slender delta wings	43		
12:45	Lunch break		12:45–14:15		
Session 6 — Coherent Structures in Reacting Multiphysics Flows					
14:15	P. Sirmalla	Global instability and non-modal mechanisms of an inductively coupled plasma jet	02	W. Polifke	
14:30	S. Nandi	Mean field resolvent analysis based modeling for the flame transfer function	24		
14:45	L. Lesshafft	Interaction between thermoacoustic and hydrodynamic instabilities in a bluff-body wake inside a channel	42		
15:00	P. Brokof	Flow oscillators vs. amplifiers in thermoacoustic instabilities – a global weakly nonlinear approach	58		
15:15	A. R. Talasikar	Modeling of Reaction Dynamics in a Turbulent Hydrogen-Air Slot Flame Using Resolvent Analysis	59		
15:30	Coffee break		15:30–16:00		
16:00	Oliver Schmidt & Miguel Mendez	Round Table 2 – Data-driven discovery of coherent structures: from spectral methods to AI			
17:00	Social event		17:00 onwards		

Friday, 3 July 2026

Time	Presenter	Title	#	
Session 7 — Reduced-Order Models for Prediction and Control				
09:30	B. Herrmann	Recent progress on data-driven resolvent analysis	60	M. Mendez
09:45	Y. Song	Data-Driven Optimal Harmonic Response and Resolvent Analysis of Turbulent Channel Flow	01	
10:00	J. S. Kern	Control-then-Reduce approach to optimal control using Dynamical Low-Rank Approximation	21	
10:15	Y. Kim	Data-driven oscillator-based modeling and prediction of multi-frequency turbulent flows	03	
10:30	L. Freire	Spectral Proper Orthogonal Decomposition of a turbulent channel flow from a coarse Wall-Modeled LES	55	
10:45	Coffee break		10:45–11:15	
Session 8 — Modal Decomposition and Structures Identification in Complex Flows				
11:15	A. Zarri	Toward a multiscale resolvent framework for unsteady and aperiodic flows	05	P. Jordan
11:30	Q. Huynh	Characterisation of coherent structures in chevron jets	10	
11:45	D. G. Smith	Analysis of the helical and flapping modes in screeching round jets using background-oriented schlieren	15	
12:00	M. Navarro-González	Dual-Time SPOD for experimental identification of spatio-temporal pattern	26	
12:15	H. Kalyankar	On Self-similarity of a Leading Edge Vortex	22	
12:30	Lunch break		12:30–14:00	
Session 9 — Physics-Informed Inference and Data Assimilation				
14:00	J. M. Reum-schüssel	Bayesian inference of model parameters for quantitatively correct CFD modeling of a reacting flow	04	M. Juniper
14:15	J. I. Rawden	Improving Physics-Informed Neural Network Inference for Turbulent Pollution Modelling Through Nonlinear Normalisation of Mean Flow Data	18	
14:30	V. Mons	An adjoint-based Bayesian approach to address non-parametric uncertainties in Reynolds-Averaged Navier-Stokes modeling	19	
14:45	U. Cadambi Padmanaban	Efficient and interpretable mean flow data assimilation of porous plates	28	
15:00	C. Namuroy	Adjoint-accelerated Bayesian inference of two-equation turbulence models from noisy Flow-MRI data	41	
15:15	Z. Wang	Multimodal Learning for Fluid Flows: Joint Representation and Bidirectional Inference from Heterogeneous Measurements	52	
15:30	I. Tirelli	Event-Driven Flow Reconstruction via Physics-Informed Spiking Neural Networks	53	
15:45	Awards and Goodbyes		15:45–16:00	