華東師範大學
EAST CHINA NORMAL UNIVERSITY

2026 ECNU Workshop on Mathematical Fluid Dynamics

Conference Program

May 17 - 19, 2026

School of Mathematical Sciences
East China Normal University

2026 ECNU
Workshop on Mathematical Fluid Dynamics

School of Mathematical Sciences
East China Normal University
China

May 17 — 19, 2026, Shanghai, China

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Workshop on Mathematical Fluid Dynamics

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Introduction:

2026 ECNU Workshop on Mathematical Fluid Dynamics aims to bring together scholars in mathematics and fluid dynamics from Germany, Japan, and China to engage in in-depth exchanges on the mathematical theory, analytical methods, and related applications of compressible and incompressible ideal fluid dynamics.

The workshop will focus on frontier topics such as new concepts, new methods, and new applications in the study of ideal fluid equations. Through invited talks, academic discussions, and collaborative exchanges, the workshop seeks to promote mutual understanding and academic trust among scholars and research groups from different countries, build a long-term platform for cooperation, and advance the development of mathematical fluid dynamics and related interdisciplinary fields.

We hope that this workshop will provide participants with an open, in-depth, and productive environment for academic exchange, enabling them to jointly explore new progress, emerging problems, and future directions in the mathematical theory of fluid dynamics.

Committee Members:

Yuanyuan Feng, Xin Gao, Xia Huang, Dong Ye, Hairong Yuan, Yanyan Zhang

Hosted by:

School of Mathematical Sciences, East China Normal University (ECNU), China

Supported by:

Key Laboratory of Mathematics and Engineering Applications, Ministry of Education, P. R. China

Contacts:

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Conference Schedule:

May 17: Conference Registration

May 18: Presentation; Open Discussion

May 19: Departure

Venue:

Lecture Hall 102, Math Building, ECNU Minhang Campus
华东师范大学闵行校区数学楼 102 报告厅

Accommodation:

Baolong Yiyue Hotel (Wujing Minhang Zizhu ECNU-SJTU Branch)

(No. 1, Lane 39, Shangyi Road, Wujing, Minhang District, Shanghai)

宝龙艺悦酒店 (吴泾闵行紫竹华师大交大店)
(上海市闵行区吴泾镇尚义路 39 弄 1 号)

Transportation (to Baolong Yiyue Hotel):

By Subway:

From Pudong International Airport, Hongqiao International Airport, or Hongqiao Railway Station, it is recommended to take the Airport Link Line to Jinghong Road Station, transfer to Metro Line 15, and exit from Exit 2 of Yongde Road Station.

From Shanghai Railway Station, it is recommended to take Metro Line 1 to Shanghai South Railway Station (or start directly from Shanghai South Railway Station), transfer to Metro Line 15, and exit from Exit 2 of Yongde Road Station.

After exiting the station, you can take a taxi to Baolong Yiyue Hotel (Wujing Minhang Zizhu ECNU-SJTU Branch), or walk about 1.1 kilometers to the hotel.

By Taxi:

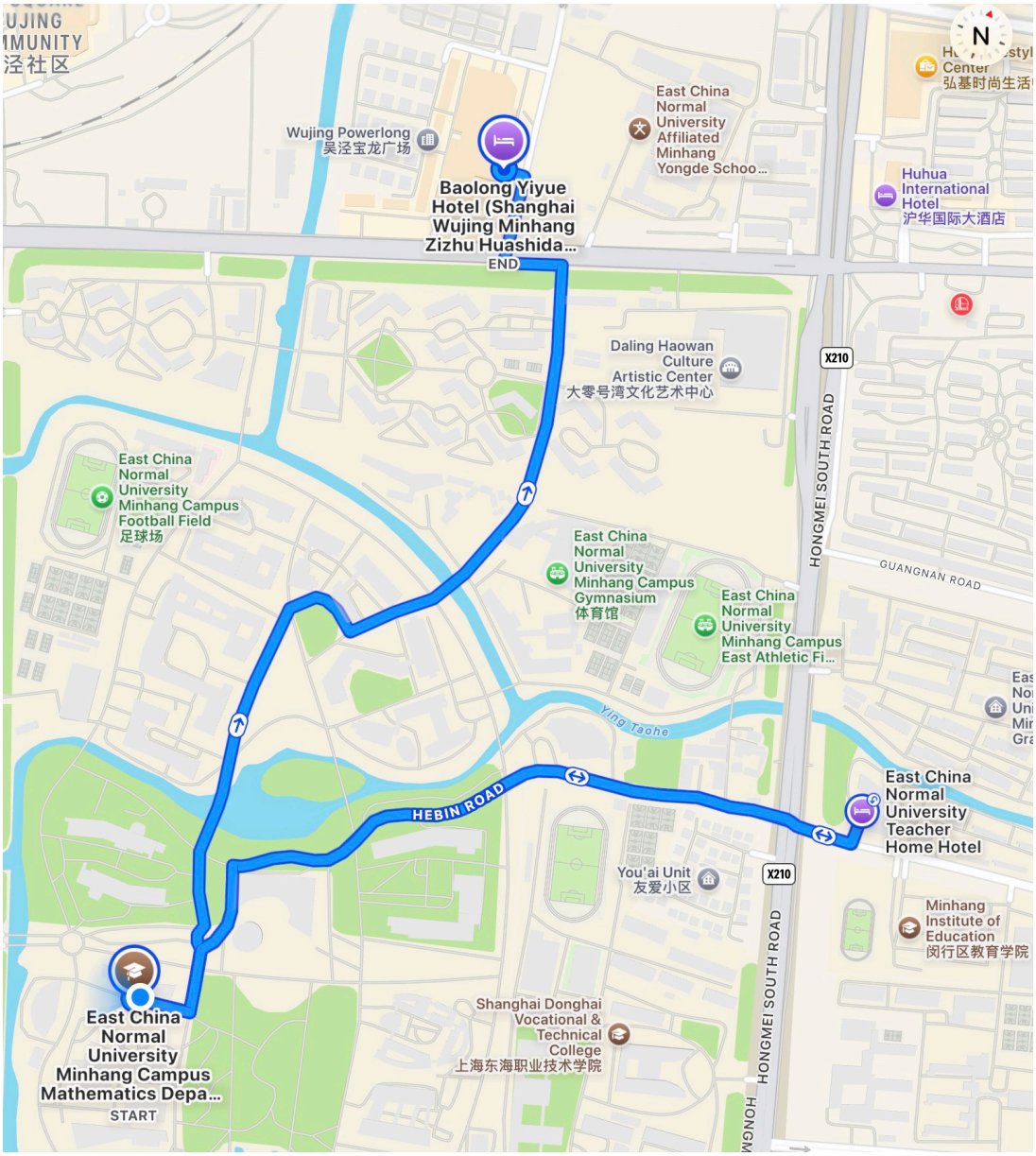
Please tell the taxi driver to go to the following address:

Baolong Yiyue Hotel (Wujing Minhang Zizhu ECNU-SJTU Branch)
No. 1, Lane 39, Shangyi Road, Wujing, Minhang District, Shanghai

宝龙艺悦酒店 (吴泾闵行紫竹华师大交大店)
上海市闵行区吴泾镇尚义路 39 弄 1 号

From Pudong International Airport, Hongqiao International Airport, Hongqiao Railway Station, Shanghai Railway Station, or Shanghai South Railway Station, you can take a taxi directly to the hotel.

The hotel is a 3-5 minute walk from the North Gate of the ECNU Minhang Campus, and a 15-20 minute walk from the Math Building.



Recommended Walking Route

Venue

Lecture Hall 102, Math Building, ECNU Minhang Campus.

华东师范大学闵行校区数学楼 102 报告厅.

Teacher Home Hotel, located 890 meters northeast of the Math Building.

教师之家, 位于数学楼东北侧 890 米处.

Part 1 Conference Program

Program at a Glance

Sunday, May 17, 2026		
Conference Registration		
Monday, May 18, 2026		
Venue (Lecture Hall 102, Math Building, ECNU)		
Time	Presentation\Event	Chair
8:40 - 8:55	Opening Ceremony; Group photo	Hairong Yuan
9:00 - 9:50	Emil Wiedemann	Dong Ye
9:50 - 10:40	Kai Hu	Xia Huang
10:40 - 11:00	Tea Break	
11:00 - 11:50	Yasuhide Fukumoto	Yuanyuan Feng
12:00 - 14:00	Lunch	
14:30 - 15:20	Chunjing Xie	Xin Gao
15:20 - 16:10	Ke Liu	Yanyan Zhang
16:10 - 16:30	Tea break	
16:30 - 17:20	Yongqian Zhang	Hairong Yuan
18:00 - 19:30	Dinner	
Tuesday, May 19, 2026		
Departure		

Sunday, May 17

Conference Registration

Monday, May 18

Chair Hairong Yuan

8:40 — 8:55 Opening Ceremony; Group photo

Chair Dong Ye

9:00 — 9:50 Emil Wiedemann: The Motion of a Rigid Body in an Inviscid Compressible Fluid

Chair Xia Huang

9:50 — 10:40 Kai Hu: Well-posedness of Overdriven Detonation Solutions to Zeldovich-von Neumann-Döring Combustion Equations

10:40 — 11:00 Tea Break

Chair Yuanyuan Feng

11:00 — 11:50 Yasuhide Fukumoto: Nambu Bracket, Isomagnetovortical Perturbations and Wave Energy of Compressible Neutral and Conducting Fluids

12:00 — 14:00 Lunch

Chair Xin Gao

14:30 — 15:20 Chunjing Xie: Some Classifications of Steady Solutions of 2D Euler System

Chair Yanyan Zhang

15:20 — 16:10 Ke Liu: Radon Measure-valued Solutions of Compressible Euler Equations and Concentration Boundary Layers in Unsteady Inviscid Flows Passing Solid Obstacles

16:10 — 16:30 Tea Break

Chair Hairong Yuan

16:30 — 17:20 Yongqian Zhang: Inverse Shock Problems

17:30 — 19:30 Dinner

Tuesday, May 19

Departure

Part 2 Titles and Abstracts

The Motion of a Rigid Body in an Inviscid Compressible Fluid

Emil Wiedemann
(University of Erlangen-Nürnberg, Germany)

We study a fluid-structure interaction problem where a rigid body is immersed in an inviscid compressible fluid. The dynamics is thus modelled through a coupling between the rigid motion and the compressible Euler equations, which in itself pose considerable mathematical challenges. We show that a generalised form of solution (a so-called dissipative measure-valued solution) can be obtained as a vanishing viscosity limit from the compressible Navier-Stokes system with Navier boundary conditions, and that the solution enjoys the property of weak-strong uniqueness. To our knowledge, this is the first rigorous result on inviscid compressible fluid-structure interaction. Rather than focus on technical details, this talk will serve as an introduction both to measure-valued solutions and to fluid-structure interaction. Joint work with Qianfeng Li (Erlangen).

Well-posedness of Overdriven Detonation Solutions to Zeldovich-von Neumann-Döring Combustion Equations

Kai Hu
(Southwest University)

The Zeldovich-von Neumann-Döring equations are developed from the compressible Euler equations. It is a significant model used to describe the dynamics of detonation and deflagration phenomena. In this talk, I will present some recent progress on the well-posedness of detonation solutions dominated by physical ignition condition. This condition results in inhomogenous heat release and the loss of uniform dissipation structures. By wave front tracking scheme, we establish the existence and stability of entropy solutions within the framework of $BV \cap L^1$ space. Our results reveal that one dimensional ZND detonation waves supported by a forward piston are indeed nonlinearly stable under small BV perturbation.

Nambu Bracket, Isomagnetovortical Perturbations and Wave Energy of Compressible Neutral and Conducting Fluids

Yasuhide Fukumoto
(IMI, Kyushu University, Japan)

For the ideal magnetohydrodynamics (MHD), the total mass, the total entropy, the magnetic helicity and the cross helicity constitute a complete set of Casimir invariants, which are regarded as topological invariants. The governing equations for ideal fluid and MHD are written in the form of Hamiltonian equations with respect to Lie-Poisson brackets. The Nambu brackets rewrite these with use of the Casimirs as the second Hamiltonians, whereby the Casimirs manifestly become constants for an arbitrary Hamiltonian. We construct a Nambu-bracket representation for the equations of the ideal compressible baroclinic MHD, with use of the latter three Casimirs. The Nambu bracket provides an insight into the isomagnetovortical perturbations and generalized Arnold's theorem which states that a steady flow of the Euler flow and MHD is an extremum of the energy. A knowledge of energy of perturbations is indispensable for analyzing stability and bifurcation of a steady state. We show how the isomagnetovortical perturbations and generalized Arnold's theorem are exploited for deriving the energy of waves on a steady flow based on the Frieman-Rotenberg equation, an equation governing evolution of linearized displacement field of fluid particles.

Some Classifications of Steady Solutions of 2D Euler System

Chunjing Xie
(Shanghai Jiao Tong University)

When two-dimensional steady flows are away from stagnation which corresponds to the critical points of the stream functions, the associated Euler equations can be locally reduced to a semilinear equation. On the other hand, stagnation of flows is not only an interesting phenomenon in fluid mechanics, but also plays a significant role in understanding many important properties of fluid equations. It also induces many challenging problems in analysis. First, we discuss the scenario when the Euler equations can be reduced to a single semilinear equation in terms of stream function, where the analysis for the topology of critical point sets and the overdetermined elliptic problems plays a crucial role. Second, we give a classification of incompressible Euler flows via the set of flow angles, where a counterpart of Picard's little theorem for steady Euler flows was established. Finally, the classification for vanishing viscosity limit of fluid via these classifications will be addressed.

Radon Measure-valued Solutions of Compressible Euler Equations and Concentration Boundary Layers in Unsteady Inviscid Flows Passing Solid Obstacles

Ke Liu
(East China Normal University)

For time-dependent compressible Euler flows passing around a fixed solid body in three-dimensional space, there may exist an infinitesimally thin layer of concentrated mass, momentum and energy, wherein all particles impacting the body move along the body's windward boundary surface. By proposing a concept of Radon measure-valued solutions for initial-boundary-value problems of the unsteady compressible Euler equations, which captures both the large-scale three-dimensional distributions of the surrounding flows and the small-scale motions of particles on the two-dimensional boundary surfaces, we derive the governing partial differential equations for the concentration boundary layer — an unsteady (pressureless) compressible Euler system defined on the boundary surface with appropriate source terms. This down-scaling approach can be further generalized to incorporate skin-frictions and phase-transitions within the concentration boundary layer. It constitutes a novel methodology for addressing the complex fluid-solid-heat coupling problems encountered in fluid dynamics. Illustrative examples are presented to demonstrate the applicability of the proposed method to several specific problems, including the Newtonian-Busemann pressure laws of hypersonic aerodynamics.

Inverse Shock Problems

Yongqian Zhang
(Fudan University)

I will talk about some inverse shock problems and related problems, and present our recent progress on the existence results for the inverse problems of determining the shape of the wedge and the cones in steady supersonic flow with the prescribed shock.

Part 3 Partial List of Participants

No.	Name	Institution
1	Yasuhide Fukumoto	IMI, Kyushu University
2	Kai Hu	Southwest University
3	Emil Wiedemann	University of Erlangen-Nürnberg
4	Chunjing Xie	Shanghai Jiao Tong University
5	Yongqian Zhang	Fudan University
6	Yuanyuan Feng	East China Normal University
7	Xin Gao	East China Normal University
8	Xiaoqing He	East China Normal University
9	Xia Huang	East China Normal University
10	Liping Wang	East China Normal University
11	Dong Ye	East China Normal University
12	Hairong Yuan	East China Normal University
13	Yanyan Zhang	East China Normal University
14	Chunyi Zhao	East China Normal University
15	Feng Zhou	East China Normal University
16	Ting Xiao	East China Normal University
17	Minghong Han	East China Normal University
18	Li Hang	East China Normal University
19	Ke Liu	East China Normal University

No.	Name	Institution
20	Shuxin Ge	East China Normal University
21	Gaoyang Li	East China Normal University
22	Yuhang Zhou	East China Normal University
23	Shanwen Xu	East China Normal University
24	Xuqiong Zeng	East China Normal University
25	Yunfeng Lu	East China Normal University
26	Yuxin Chen	East China Normal University

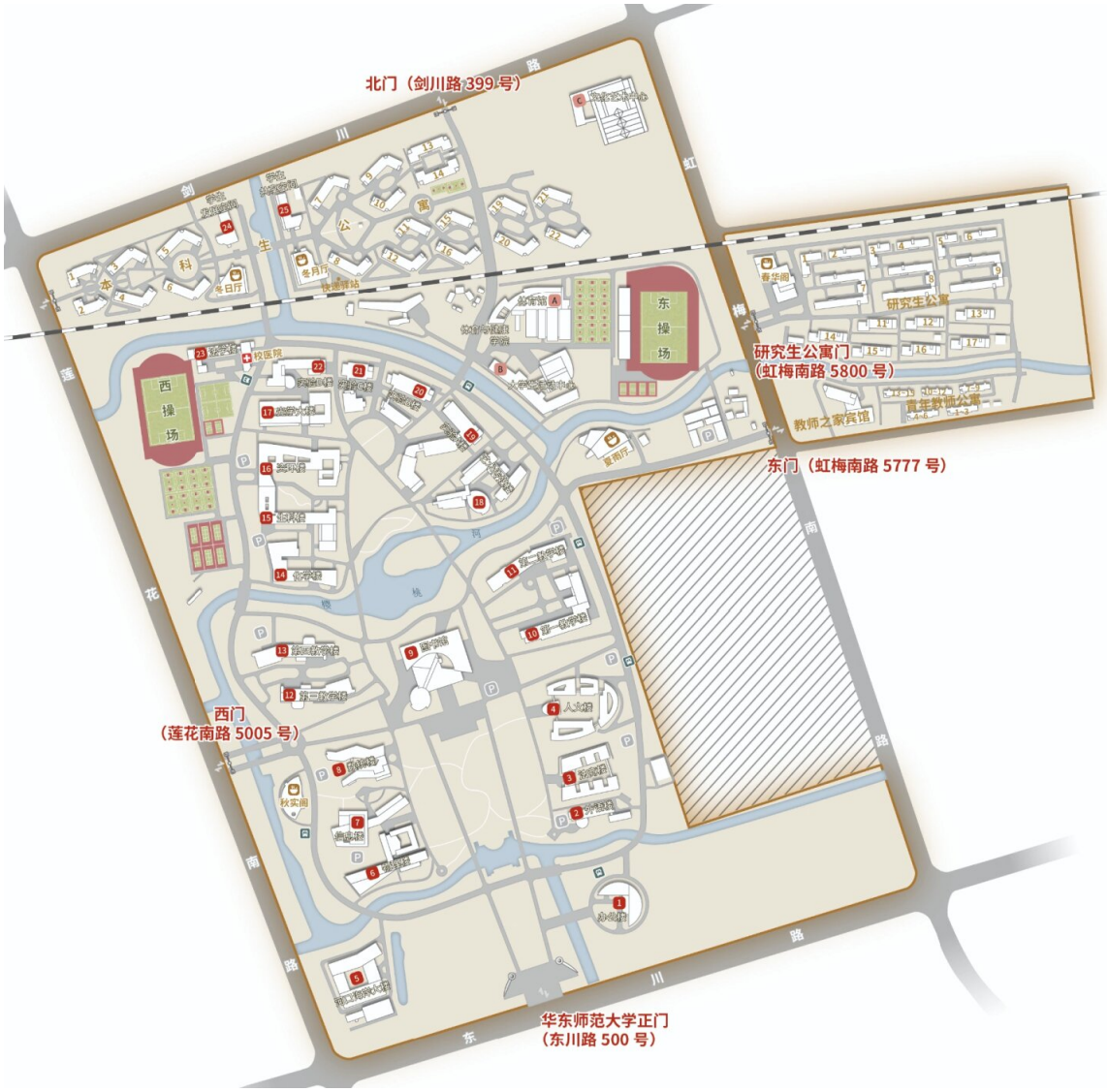
Part 4 Introduction to the School of Mathematical Sciences

The School of Mathematical Sciences at East China Normal University is a major national hub for mathematical research, talent cultivation, and the preparation of secondary school mathematics teachers. In the latest round of disciplinary evaluations by the Ministry of Education, the School received an excellent rating, and its research output ranks in the top 0.5% globally according to ESI rankings.

The School comprises three departments: Pure Mathematics, Applied Mathematics, and Mathematics Education. It offers a full range of specializations and possesses strong research capabilities. Its research platforms include the Ministry of Education Key Laboratory of Mathematics and Engineering Applications, the Shanghai Key Laboratory of Pure Mathematics and Practice, and several specialized mathematics research centers.

The discipline has a rich historical legacy. In particular, since the 1980s, under the guidance of mathematicians and educators such as Cao Xihua, Xiao Gang, and Zhang Dianzhou, East China Normal University became a pioneer in algebraic group and algebraic geometry research in China, as well as a leading institution in mathematics education research.

The School has an outstanding reputation in talent cultivation. It has been recognized as a national base for scientific research and talent training, a national characteristic program, and a national first-class un-



ECNU Minhang Campus Map

dergraduate program. The School also offers a special program for students in basic sciences and has been selected for the Ministry of Education′s "Pilot Program 2.0 for Top-Notch Talent Training". It has cultivated a large number of mathematicians, scientists, educators, entrepreneurs, and technology professionals, making it a successful model for cultivating diverse, interdisciplinary talent in mathematics.

Part 5 Introduction to the Key Laboratory of Mathematics and Engineering Applications, Ministry of Education

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The Key Laboratory of Mathematics and Engineering Applications, Ministry of Education, focuses on theoretical and applied research addressing the mathematical needs in smart transportation engineering and coastal and ecological engineering. Being problem-oriented and aiming for practical implementation, the laboratory conducts problem-driven mathematical research and applications, deeply investigating the underlying mathematical theories for broader applications. Leveraging Shanghai's locational advantages, the laboratory serves the regional construction and development needs of both the nation and the Shanghai area.

The laboratory integrates university-level research platforms at East China Normal University, such as the Algebra Research Center, the Center for Partial Differential Equations, the Center for Geometric Analysis, and the Center for Applied Mathematics and Interdisciplinary Studies. It consolidates key development directions, precisely aligns with national strategies, and enhances the capability for collaborative innovation across industry, academia, and research, as well as the capacity to undertake major national and local projects. In basic research, it focuses on frontier fundamental problems with application prospects, using pure mathematics to provide disruptive technologies for mathematical applications. In applied

mathematics, it conducts problem-driven research to provide mathematical support for national and regional innovative development.


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