Dynamical Systems Day

The goal of the workshop will focus on partially hyperbolic dynamics.

Time and Venue:

September 10, 2025, Siyuan Hall, Zhihua Building (智华楼四元厅), Peking University

Institution：

Peking University

Invited speakers:

Marcelo Viana (IMPA)
Weixiao Shen (Fudan University)
Yi Shi (Sichuan University)

Schedule:

Time	Titles	Speakers
8:30-9:00	Opening Session	
9:00-11:30	Free discussion	
11:30-13:30	Lunch	
14:30-15:30	Partially hyperbolic dynamics	Marcelo Viana
15:30-16:00	Tea break	
16:00-17:00	Typicality of periodic optimization over an expanding circle map	Weixiao Shen
17:00-18:00	Lyapunov spectrum rigidity and simultaneous linearization of random Anosov diffeomorphisms	Yi Shi

Contact：

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Titles, abstracts and biographies:

Partially hyperbolic dynamics

Marcelo Viana (IMPA)

Abstract: The concept of a hyperbolic dynamical system was introduced by S. Smale, D. Anosov and Ya. Sinai in the 1960's. One goal was to characterize (structurally) stable systems, that is, whose qualitative behavior is not affected by small perturbations of the system. That was eventually achieved in a tour de force by R. Mañé and others. Another goal was to provide a paradigm for the behavior of "most" dynamical systems. This turned out to be too optimistic and, in response, various generalizations of hyperbolicity have been proposed. Among them, the notion of partial hyperbolicity proved to be particularly fruitful, and has been at the heart of the research in the field for the last 30 years or so.
I will briefly discuss some of the surprising features exhibited by partially hyperbolic systems, especially concerning rigidity, Lyapunov exponents and pathological foliations.

Biography: Marcelo Viana is a Professor of Mathematics and the Director of the Instituto de Matematica Pura e Aplicada (IMPA) in Rio de Janeiro. Marcelo Viana's research concerns dynamical systems. He has received many honors and awards. He was an invited speaker at the International Congress of Mathematicians Zurich 1994 and a plenary speaker at the International Congress of Mathematicians Berlin 1998. He is a member of the Brazilian Academy of Sciences and TWAS. In 2005 he was awarded the inaugural Ramanujan Prize by ICTP for his research achievements. In 2016 he was the joint recipient of the Le Grand Prix Scientific from the Institut de France.
Viana was the Vice-President of the International Mathematical Union (2011-2014) and the President of the Brazilian Mathematical society (2013-2015). He was Chair of the executive committee for the 2018 International Congress of Mathematicians in Rio de Janeiro.

Typicality of periodic optimization over an expanding circle map

Weixiao Shen (Fudan University)

Abstract: We study the ergodic optimization problem over a real analytic expanding circle map. We show that in both the topological and the measure-theoretical senses, a typical C^r performance function has a unique maximizing measure and the unique maximizing measure is supported on a periodic orbit, for r>1. This is a joint work with Rui Gao and Ruiqin Zhang.

Biography:

Weixiao Shen is a professor of Mathematics at Fudan University and a member of Chinese Academy of Sciences. His research interests focus on dynamical systems. Shen has published a number of papers in world-class journals of mathematics, addressing many critical problems in the field of dynamical systems. He was an invited speaker at the International Congress of Mathematicians Seoul 2014. In 2009, he became the youngest winner of Chen Xingshen Maths Prize awarded by the Mathematical Society of China. He won the Xplorer Prize in 2021 and was a researcher in the inaugural New Cornerstone Investigator Program in 2023.

Lyapunov spectrum rigidity and simultaneous linearization of random Anosov diffeomorphisms

Yi Shi (Sichuan University)

Abstract: Let A be an Anosov automorphism on T2 and {f1,...,fk} be a family of Cr-random perturbations of A with r>2. We show that {f1,...,fk} is Lyapunov spectrum rigid, i.e. any stationary SRB measure has the same Lyapunov exponents to A, if and only if there exists a smooth conjugacy simultaneously linearize {f1,...,fk} to affine actions. As an application, we show that a random action of positive matrices in SL(2,Z) has positive Lyapunov spectrum rigidity if and only if the action can be simultaneous linearized. This is a joint work with A. Brown.

Biography: Yi Shi is a Professor at the School of Mathematics, Sichuan University. He obtained his doctoral degrees from Peking University and Universite de Bourgogne (France) respectively. His research focus is on differentiable dynamical systems. He published papers in journals such as Proc. Lond. Math. Soc., Compos. Math., Adv. Math., and Comm. Math. Phys. etc.