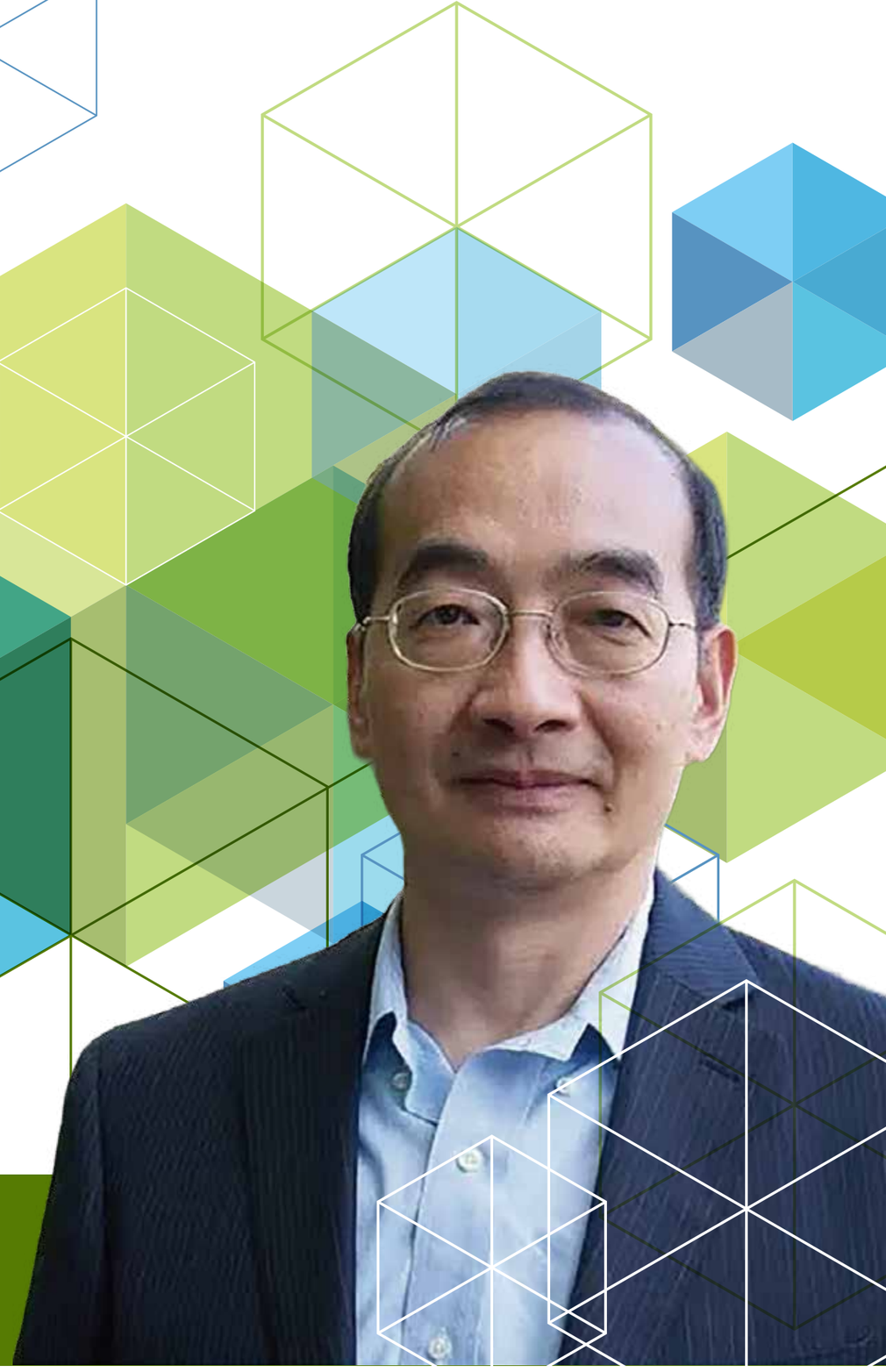
Date 2026.7.2

Venue R515, Cosmology Bldg., NTU



National Center for Theoretical Sciences

Meet with Prof. Horng-Tzer Yau

Random Matrices: Wigner Universality, Anderson Delocalization, and Beyond

Abstract

In this lecture we review developments in random matrix theory with an emphasis on progress over the past two decades. The guiding principle is Wigner's universality thesis, which asserts that the spectral statistics of highly correlated systems resemble those of classical random matrix ensembles. Anderson's localization--delocalization transition for the tight-binding model extends this vision to non-mean-field models. The main results covered in this lecture include the resolution of the Wigner--Dyson--Mehta conjecture; the Sarnak--Miller--Novikoff--Sabelli conjecture on Ramanujan graphs; and delocalization and universality for band matrices and block Anderson models in all dimensions.

We begin by reviewing the three-step strategy for establishing universality in mean-field random matrices, and the obstacles to extending this strategy to non-mean-field ensembles.

We then outline a new method based on the loop hierarchy and its tree approximation, which yields quantum diffusion.

Finally, we explain how quantum diffusion modifies the three-step strategy and leads to proofs of universality for non-mean-field models

Invited Speaker

Horng-Tzer Yau

Harvard University

Agenda

13:45-14:00 Registration

14:00-15:00 Lecture

15:00-15:30 Q&A

15:30-16:00 Tea Time

Organizer

Mao-Pei Tsui

National Taiwan University

Contact Peggy Lee

peggylee@ncts.tw