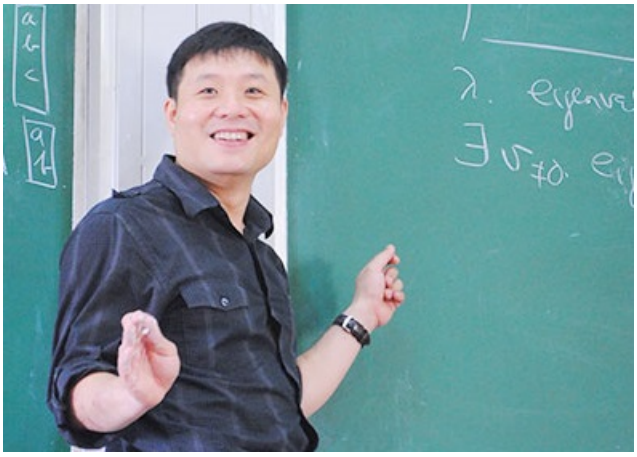
DEPARTMENT OF MATHEMATICS AND STATISTICS

SHOEMAKER LECTURE SERIES

Supported by the Richard Shoemaker Fund

COLLEGE OF NATURAL SCIENCES AND MATHEMATICS
THE UNIVERSITY OF TOLEDO



Dr. Van Vu

Percey F. Smith Professor of Mathematics
Yale University

Prof. Van Vu received his Ph.D. from Yale University in 1998 under the direction of László Lovász. Having spent time at Institute for Advanced Study, Microsoft Research, UC San Diego and Rutgers, he currently hods the Percey F. Smith Professor of Mathematics at Yale University. He is also affiliated with the Department of Statistics and Data Science, Yale University.

His research interests include Probabilistic Combinatorics, Additive Combinatorics, and Random Matrices. Together with his collaborators, Prof. Vu solved the Erdos-Folkman problem, the Shamir conjecture, and the circular law conjecture. He was a recipient of several awards: Sloan Fellows (2002), Polya Prize (2008), Fulkerson Prize (2012). In 2012, he became a fellow of the American Mathematical Society and was a Medallion lecturer at the 8th World congress in Probability and Statistics, Istanbul. He was an invited speaker at the ICM (Seoul) in 2014. He was named a fellow of the Institute of Mathematical Statistics in 2020.

Lecture I: Matrix completion and random perturbation

Thursday, October 05, 2023
5:00 – 6:00 PM
GH 5300

Abstract. A practical problem of fundamental interest is to complete a large data matrix from relatively few observed entries. A well-known example is the Netflix prize problem.

Perturbation theory provides perturbation bounds on spectral parameters of a matrix under a small perturbation. In recent works, we discovered that many classical perturbation bounds (such as Weyl theorem) can be improved significantly when the perturbation is random.

In this talk, I will going to give a brief survey on mathematical approaches to the matrix completion problems, and discuss a very simple new algorithm based on results concerning random perturbation.

Lecture II: The circular law

Friday, October 06, 2023
4:00 – 5:00 PM
GH 5300

Abstract. The circular law is the asymmetric counterpart of Wigner semi-circle law. It asserts that the (complex) eigenvalues of a typical random asymmetric matrix distribute uniformly on the unit circle (after a standard normalization).

Wigner semi-circle law was proved in the 1950s. But Circular Law was proved in full generality only in the 2000s. Why this delay?

We are going to discuss the mathematical developments that lead to the solution of the **Circular Law conjecture**.