



OIST

OKINAWA INSTITUTE OF SCIENCE AND TECHNOLOGY
沖縄科学技術大学院大学

VISITING PROGRAM

Public Lecture

3-Manifolds and Langlands Duality

2026
THU.

SEP. 03

16:10–17:10

HYBRID

B250, ZOOM



For zoom and other details scan QR code or visit oist.jp/visiting-program

Mathematics has two fundamental subjects: numbers and shapes. Although they may appear very different, there are many deep analogies between them. One of the most mysterious is the analogy between algebraic number theory and 3-dimensional topology, in which prime numbers correspond to knots. Motivated by this analogy, we may ask the following question:

What is the topological counterpart of Langlands duality for 3-manifolds?

Surprisingly, Kapustin and Witten proposed an answer to this question from the perspective of theoretical physics. Using gauge theory, they interpreted Langlands duality as a form of electromagnetic duality. More recently, this conjectural picture has been brought into mathematics through derived algebraic geometry, a brave new framework for algebraic geometry built on ideas from homotopy theory.

In this talk, we will survey recent progress toward this conjecture, emphasizing the perspective of 4d TQFT and the relationships among the theories associated with different gauge groups.

This is a public lecture intended for a broad audience, including non-specialists, and will focus on the underlying ideas and motivations rather than technical details.



Tasuki Kinjo

RIMS, Kyoto University

Tasuki Kinjo is an assistant professor of pure mathematics at RIMS, Kyoto University. He was born to parents from Okinawa and spent several years of his childhood there. He began his research career in Donaldson–Thomas theory. After concluding that Calabi–Yau threefolds (six-dimensional as real manifolds!) were perhaps too difficult for humans, he turned to applications of derived geometry to gauge theory on real three-manifolds.

oist.jp/visiting-program

CONTACT

Office of the Dean of Research



tsvp@oist.jp