

# Sophia University

## Mathematics Colloquium

**When:** Friday, April 27, 2018, 17:30—18:30

**Where:** Room No. 201, Main Bldg., Ichigaya-Campus

**Speaker:** Toshiki Nakashima (Sophia University)

**Title:** Geometric crystals on cluster varieties

### **Abstract:**

The notion of geometric crystal was initiated by A. Berenstein and D. Kazhdan to consider certain geometric analogue to the Kashiwara's crystal base theory. Their structures are described by rational maps and rational functions. If all these rational maps and functions are "positive", such geometric crystals are called "positive" and they can be transferred to the "Langlands dual crystal bases" by tropicalization/ultra-discretization procedure. V. Fock and A. Goncharov defined certain pair of varieties  $(A, X)$ , called "cluster ensemble" which is obtained by glueing algebraic tori using the "A-mutations and X-mutations" respectively. They gave the conjectures on "tropical duality" between cluster ensemble A-variety and X-variety (called Fock-Goncharov conjectures). We shall define the positive geometric crystal structure on cluster varieties and then obtain the resulting tropicalized crystals, which will be a guide to understand the Fock-Goncharov conjectures in terms of crystal base theory. This is a joint work with Yuki Kanakubo.