Characterization of finite metric spaces by their isometric sequences

Mitsugu Hirasaka
Pusan National University, South Korea
hirasaka@pusan.ac.kr

This is a joint work with Masashi Shinohara

Let (X, d) be a metric space where $d : X \times X \to \mathbb{R}_{\geq 0}$ is a metric function. For $A, B \subseteq X$ we say that A is *isometric* to B if there exists a bijection $f : A \to B$ such that $d(x, y) = d(f(x), f(y))$ for all $x, y \in A$. We shall write $A \simeq B$ if A is isometric to B. For a positive integer k we denote by $A_k(X)$ the quotient set of $\binom{X}{k}$ by $\simeq$, i.e.

$$A_k(X) = \left\{ [A] \mid A \in \binom{X}{k} \right\},$$

where $[A]$ is the isometry class containing A. For a finite metric space (X, d) we call $(|A_i(X)| : i = 1, 2, \ldots, |X|)$ the *isometric sequence* of X. In this talk we aim to characterize metric spaces X by their isometric sequences, and classify them with the property $|A_2(X)| = |A_3(X)| \leq 3$.