

# Algebraic Geometry

## Linear systems on irregular varieties

**Rita Pardini**

University of Pisa, Italy

Given a generically finite map  $a : X \rightarrow A$ , where  $X$  is a smooth projective variety and  $A$  is an abelian variety, and given a line bundle  $L$  on  $X$ , we study the linear system  $|L + P|$ , where  $P$  is a general element of  $\text{Pic}^0(A)$ . We prove that up to taking base change with a suitable multiplication map  $A \rightarrow A$ , the map given by  $|L + P|$  is independent of  $P$  and induces a factorization of the map  $a$ . When  $L$  is the canonical bundle of  $X$ , this factorization is a new geometrical object intrinsically attached to the variety  $X$ .

The factorization theorem also allows us to improve the known Clifford–Severi and Castelnuovo type numerical inequalities for line bundles on  $X$ , under certain assumptions on the map  $a : X \rightarrow A$ . A key tool in these proofs is the introduction of a real function, the continuous rank function, that also allows us to simplify considerably the proof of the general Clifford–Severi inequality.

This is joint work in progress with M.A. Barja (Barcelona) and L. Stoppino (Como)