



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

## **ALGEBRA AND GEOMETRY SEMINAR**

# **Cohomology theories and rings of functions**

by

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### **Abstract**

Extending the classical Poincaré-Hopf theorem, the work of Akyildiz, Carrell, Liebermann, Sommese shows how to recover the cohomology ring of a smooth projective variety from isolated zeros of a vector field. Thirty years later, Brion and Carrell showed how to find the spectrum of the torus-equivariant cohomology as a geometrically defined scheme, provided that the Borel of  $SL_2$  acts with a single fixed point of the regular unipotent. In a joint work with Tamas Hausel we demonstrate how to see the spectrum of  $G$ -equivariant cohomology, if  $G$  is a linear group acting with similar assumptions. This condition covers many interesting cases, including flag varieties and Bott–Samelson resolutions. I will present this work and also show how to see the equivariant cohomology rings of spherical varieties as rings of functions on non-affine schemes. Besides, there are a lot of new directions and open questions I would like to advertise. This in particular concerns general, potentially singular varieties, as well as other equivariant cohomology theories.

**Date : 6 November 2023 (Monday)**

**Time : 4:00pm – 5:30pm**

**Venue : Room 5560 (Lifts 27/28)**

*All are Welcome!*