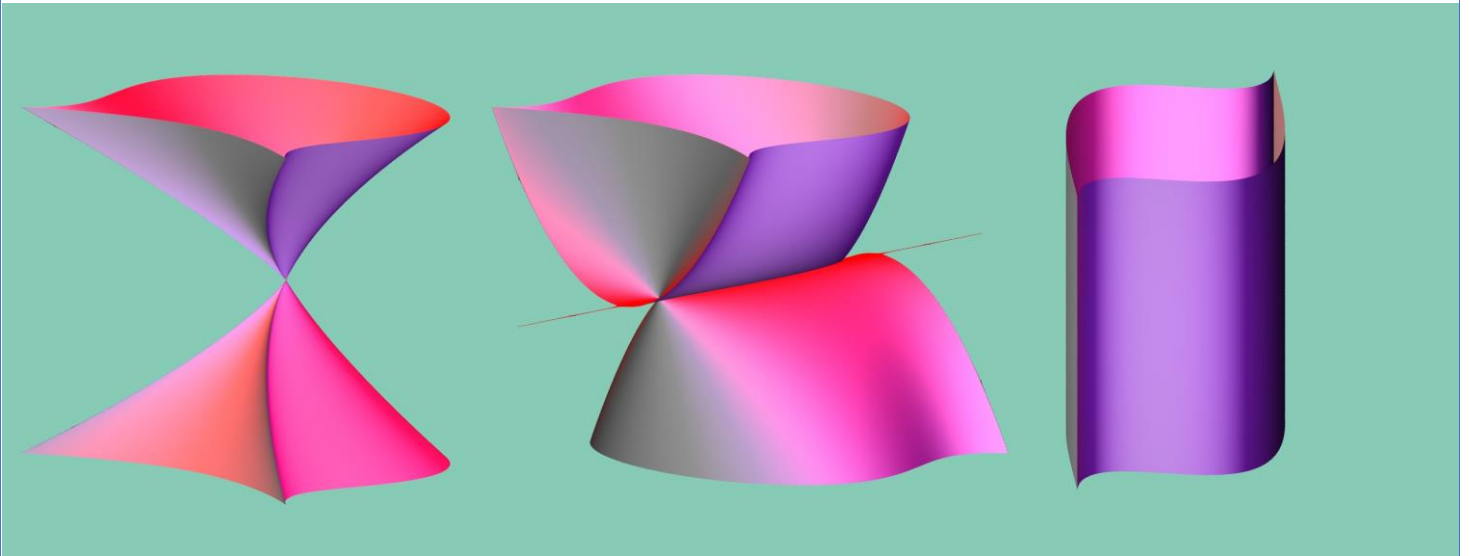


# Resolution of Singularities | Short Course

**Herwig Hauser** (University of Vienna)



**February** | Faculty of Sciences, University of Lisbon | **room 6.2.33**

**Friday 9, 11:00-12:30**

**Wednesday 14, 15:00-16:30**

**Monday 19, 11:00-12:30** (*uncertain*)

**Wednesday 21, 11:00-12:30**

**Friday 23, 11:00-12:30**

The Resolution of Singularities of algebraic varieties is a classical central topic of algebraic geometry and commutative algebra. Applications are numerous, while its reputation persists as representing one of the most difficult problems in algebraic geometry. Over fields of characteristic zero, e.g., the complex numbers, the spectacular proof of Hironaka of the existence of resolutions (Annals Math 1964) was treated for a long time as intractable. Meanwhile, more systematic proofs have been developed, and one can even assert that a certain understanding is nowadays accessible for a general audience. In the course, we will describe at length the main tool, say, blowups, giving various equivalent characterizations and showing how to use them. A second step will be the construction of a local invariant (a string of non-negative integers) measuring the complexity of a variety at a singular point. This, in turn, will allow us to stratify the variety, to blow up the worst (most singular) stratum, and to show that after the blowup the local invariant has dropped. By induction, the process must terminate after finitely many steps, and a resolution is achieved.

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