

## INTERACTIVE TUTORIAL: MACAULAY2 DAY AT THE FIELDS INSTITUTE

- 1. Basic operations on an ideal.** Create the homogeneous ideal of the twisted cubic curve in four different ways—as the kernel of a ring map, via elimination, using the `monomialCurveIdeal` method, and as the minors of a matrix. Find the Hilbert polynomial, evaluate the Hilbert function at several values.
- 2. Making functions.** Create a function which outputs the Brill–Noether number. For which values of the degree, dimension, and genus (all at most 15), is the Brill–Noether number equal to 1.
- 3. Random Things.** Create a random matrix. Create a random ideal in  $\frac{\mathbb{Z}}{32003\mathbb{Z}}[x, y, z]$ . How can you create a random set of points in  $\mathbb{P}^2$ ?
- 4. Using Packages.** Load the “NormalToricVarieties” package. Create a singular toric variety and its resolution of singularities.