# Algebraic Geometry and Commutative Algebra

## Chris Peterson

This course will cover the basics of algebraic geometry together with closely related concepts in commutative algebra. There will be an additional emphasis on learning how to make explicit computations using tools such as Gröbner bases, homotopy continuation, and the LLL algorithm.

For the first part of the course we will use the book *Ideals, Varieties, and Algorithms: An introduction to computational algebraic geometry and commutative algebra*, by David Cox, John Little, Donal O'Shea. We will be using the Fourth edition (ISBN 978-3-319-16720-6).

In the later part of the course, as we gain more dexterity with theoretical and computational aspects, we will be able to cover ideas that go beyond the topics covered in this book. Some of the additional topics that we cover will be driven by student interest.

As a prerequisite to the course, we will assume some basic familiarity with groups, rings, fields, and modules (but by no means are you expected to be an expert in these topics).