

ALGEBRAIC GEOMETRY: COMPUTATIONS AND APPLICATIONS

ALICIA DICKENSTEIN AND BERND STURMFELS

This is a one-semester **advanced graduate course** to be held concurrently with the research program on *Algebraic Geometry with a View towards Applications* at the Mittag-Leffler-Institute. It will be co-taught by Alicia Dickenstein from Buenos Aires and Bernd Sturmfels from UC Berkeley. The class will meet **Mondays at 10:00-12:00** in Room 3721. The first meeting will be held on **January 17, 2011**.

Prerequisites: Undergraduate Algebraic Geometry, specifically familiarity with Gröbner bases as in the text book *Ideals, Varieties and Algorithms* by Cox, Little and O’Shea. Experience with mathematical software (e.g. Mathematica, Macaulay2, Singular, Sage) will be useful.

Objective: This class offers an opportunity for graduate students and postdoctoral fellows with widely different backgrounds and interests to learn from each other, and to engage with the international community of experts who are based in Stockholm during the spring semester.

Format: Each Monday a new topic will be presented, and there will a homework set on that topic, to be handed in on the following Monday. After the lecture, we’ll go for lunch, and participants are encouraged to meet for informal discussions in the afternoon. Related research seminars might follow. Some of us might also go out for dinner, and we are counting on the local students to show us their favorite spots.

Examination: The course grade will be based on homework and in-class participation. Collaboration on the homework is strongly encouraged, but every student is asked to turn in her or his own homework set.

Syllabus: Algebraic Statistics, Convex Algebraic Geometry, Elimination, Implicitization, Tropical Algorithms, Bio-chemical applications.

References: In addition to research articles, take a look at the books D.Cox, J.Little, D.O’Shea: *Using Algebraic Geometry*, Springer, 1998. A.Dickenstein and I.Emiris (eds.): *Solving Polynomial Equations: Foundations, Algorithms, and Applications*, Springer, 2005. B.Sturmfels: *Solving Systems of Polynomial Equations*, AMS, 2002.