# SUPERTROPICAL QUADRATIC FORMS

**Manfred Knebusch**
**Universitaet Regensburg (Regensburg, Germany)**

Bourbaki's notion of a valuation on a ring (Alg. commutative VI) readily generalizes to semirings, but, of course, studying these leads to new phenomena. Such a valuation can be viewed as a map into another semiring of special nature (a "bipotent" semiring). It is possible to lift this map in various ways to a "supervaluation" with values in a "supertropical semiring", which has "tangible" and "ghost" elements, and is equipped with a retraction (the "ghost map") to the set of ghosts, which itself is a bipotent semiring.

Supervaluations—even on fields—have the potential to refine and understand tropical geometry in a new way. In the present talk I will be content to apply a supervaluation $f$ on a ring $R$ to a quadratic from $q$ on a free module $V$ over $R$. This, after choice of a base of $V$, gives a quadratic form $q'$ on a free module over the target supertropical semiring $U$.

The supertropicalization $q'$ may depend on the choice of the base of $V$. Perhaps contrary to initial expectations, this is a strong point of the theory: The form $q'$ over $U$ is a very combinatorial and rigid object, which in some sense measures the "position" of $q$ with respect to the chosen base of $V$ via the supervaluation $f$, and all bases of $V$ are admitted here.

**This is joined work with Zur Izhakian and Louis Rowen**
**(Bar Ilan University, Israel)**