Mark Gross: **Mirror Symmetry**

In 2001, Bernd Siebert and I began a program to understand mirror symmetry by constructing mirrors of Calabi-Yau varieties as degenerations, describing the degenerations via explicit smoothings of the central fibre encoded in terms of tropical geometry. These constructions have led, at this point in time, to at least an intuitive understanding of how a mirror partner encodes information about rational curves on the original geometric object. I will attempt to explain this intuition at an elementary level. Further, I will touch on current ideas involving theta functions (a generalization of theta functions on abelian varieties, currently being developed with Hacking, Keel and Siebert) and a logarithmic version of Gromov-Witten invariants, (whose theory is being developed with Abramovich, Chen and Siebert). These ideas should lead to making this intuition rigorous.