

## **Bend relations, valuations, and universal tropicalization**

Jeff Giansiracusa  
University of Swansea

### **Abstract:**

Let  $X$  be a locally integral scheme over a non-archimedean valued field  $k$ . An embedding of  $X$  into a scheme equipped with a model over the field with one element determines a tropicalization of  $X$ , and the equations defining this tropicalization are given by 'bend relations'. The base-change adjunction between  $F_1$  and  $k$  yields a universal embedding into an ambient space with  $F_1$  model, and thus there is a universal tropicalization. Moreover, in this case solutions to the bend relations are exactly non-archimedean valuations on the structure sheaf of  $X$ . Thus the Berkovich analytification can be realized as an algebraic moduli space of valuations.