

## INVITED LECTURE H9

### **Twist and bend of a crystalline actin bundle stores nN force**

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A preassembled bundle of actin filaments crosslinked by the kelch-domain protein scruin, is twisted and bent to encircle the base of the nucleus of a horseshoe crab sperm. When activated by calcium, the acrosomal actin bundle untwists and extends 60  $\mu\text{m}$  in 5 seconds. Stall experiments measure a maximum force of 2-3 nN for the reaction. Based on mechanical measurements of the bundle, a 9.5  $\text{\AA}$  structure and a preliminary reconstruction of the coiled bundle, and estimates of the energetics, we propose a model in which the extended bundle is an unstable intermediate which becomes the stable low energy state upon calcium-binding.