

## **IMR 2017 Poster abstract from G Butlin et al**

### **Fully automatic mid-surfacing**

Fully automatic mid-surfacing that produces accurate, fully connected and clean surface models suitable for meshing remains elusive. The Medial Axis Transformation (MAT) provides the ultimate mid-surface in the sense that it is indeed the accurate mid-surface everywhere within a solid object, right down to sharp corners where the thickness goes to zero. However, this has long been considered as not being exactly what an engineer wants in order to exploit the engineer's theory of bending for thin materials. So, at ITI, after computing the full MAT mid-surface, it has been adjusted to remove such undesirable flaps and features.

Most FEA mid-surfacing tools represent T-junctions as simple 'straight' junctions. However, the MAT accurately represents the increased thickness at junctions including any fillets. Arguments persist as to the most appropriate representation for complex variable thickness junctions.

ITI has run some numerical simulations, comparing the results of full, accurate solid meshes with MAT-derived mid-surface meshes which include cusped junctions that represent the true geometrical mid-surface.

The poster will demonstrate that these MAT-based mid-surface meshes, are not only reliably accurate, but they represent filleted junctions better than the traditional, straight T-junctions.