Method S2. Automatically Checking for Mesh Model Interpenetration in Maya

From the first frame of a Maya 2016 (Autodesk, San Rafael, CA, USA) animation, select two mesh models and run a Boolean intersection operation. Rename the resulting intersection mesh "boo." In this study, rotations were set using a character animation joint called "myJoint" (see Supplementary Method S1), so a Boolean-type attribute called "viable" was added to myJoint. If no character animation joint is used, the attribute "viable" can be added to either of the two mesh models.

The following MEL code can be used to create a new expression in the Expression Editor:

```
float $area[] = `polyEvaluate -area boo`; //compute surface area of intersection mesh

if ($area[0] >0) setKeyframe -at viable -v 0 myJoint; //if the mesh exists (i.e., has a positive surface area), the pose is inviable

else setKeyframe -at viable -v 1 myJoint; //if the mesh does not exist (i.e., has zero surface area), the pose is viable
```

When the animation is played, this expression will check for mesh model interpenetration by querying intersection mesh surface area, and will keyframe the viability of each pose as 1 (viable) or 0 (inviable) at each key in the keyset.