HIPS - A Virtual Reality
Hip Prosthesis Implantation Simulator

M. Kaluschke, R. Weller, G. Zachmann, CGVR University of Bremen,
Technical University Chemnitz, FAKT Software, CAT PRODUCTION

Motivation
- Training surgery students
- Challenge: milling of hip socket
- Surgeon can not see situs
  - Feeling is crucial

Methods
- Inner sphere representation
- Continuous collision detection using swept spheres
- Constraint-based haptics
- Massively-parallelized on GPU

Results
- 2 kHz for coll.det. w/ 50k spheres
- Haptic thread at 2000 Hz
- Robust, stable forces up to 137 N with KUKA LBR iiwa robot
- 32k polygons