HIPS - A Virtual Reality Hip Prosthesis Implantation Simulator

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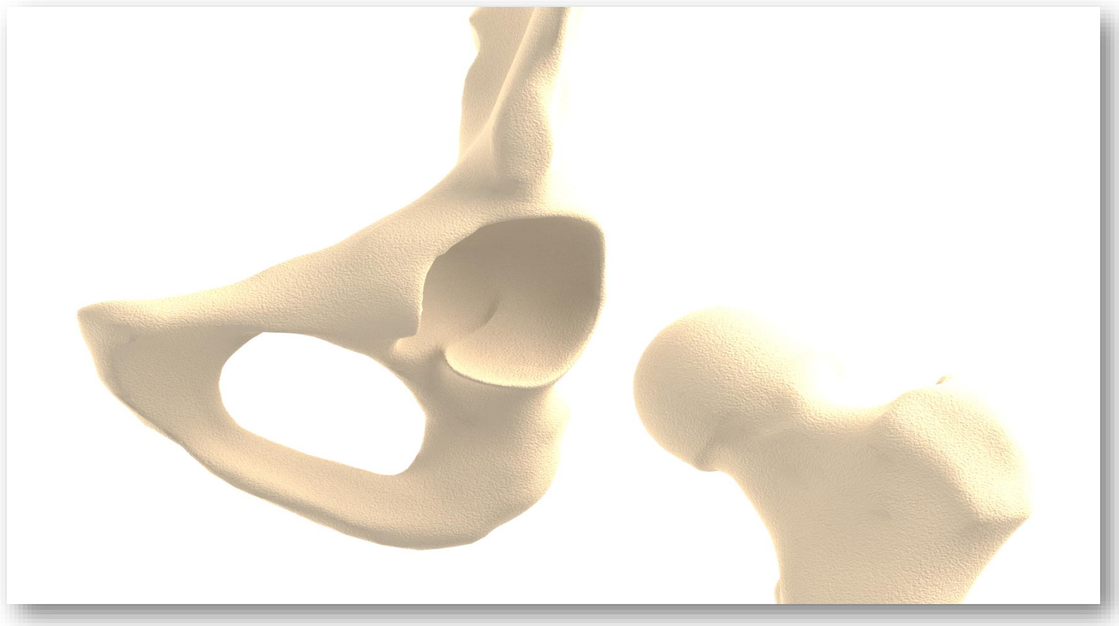
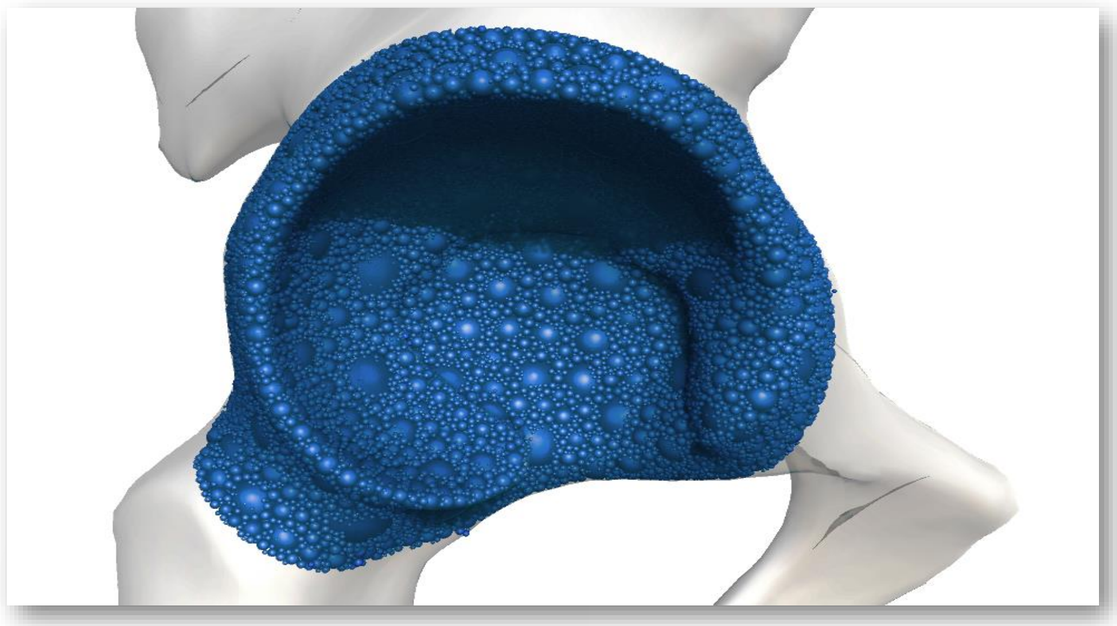
Motivation

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

Methods

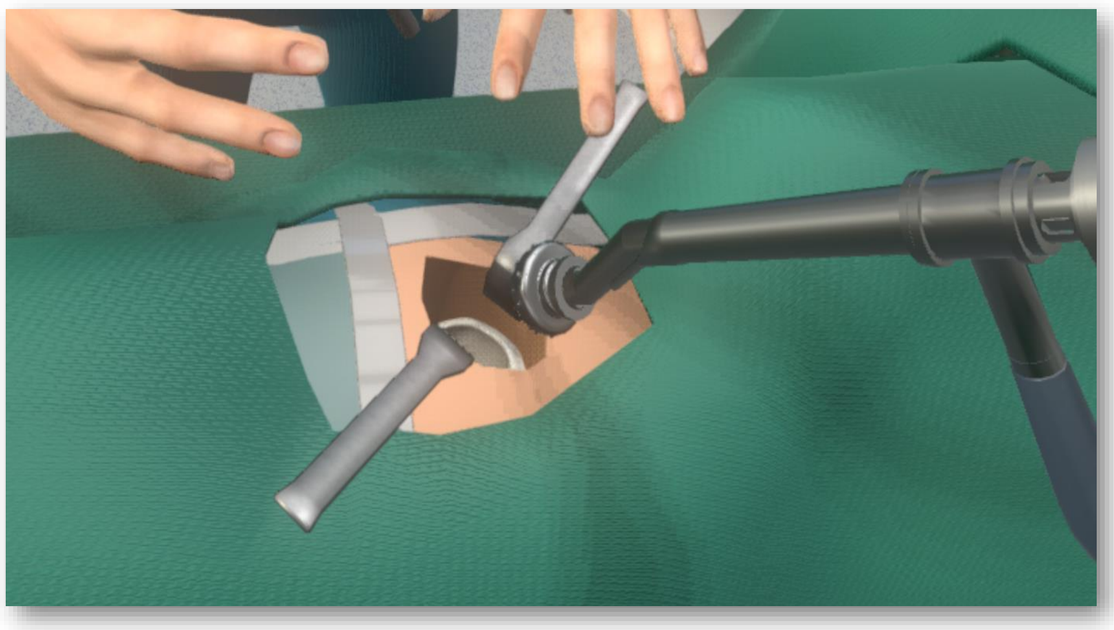
- Inner sphere representation
- Continuous collision detection using swept spheres
- Constraint-based haptics
- Massively-parallelized on GPU

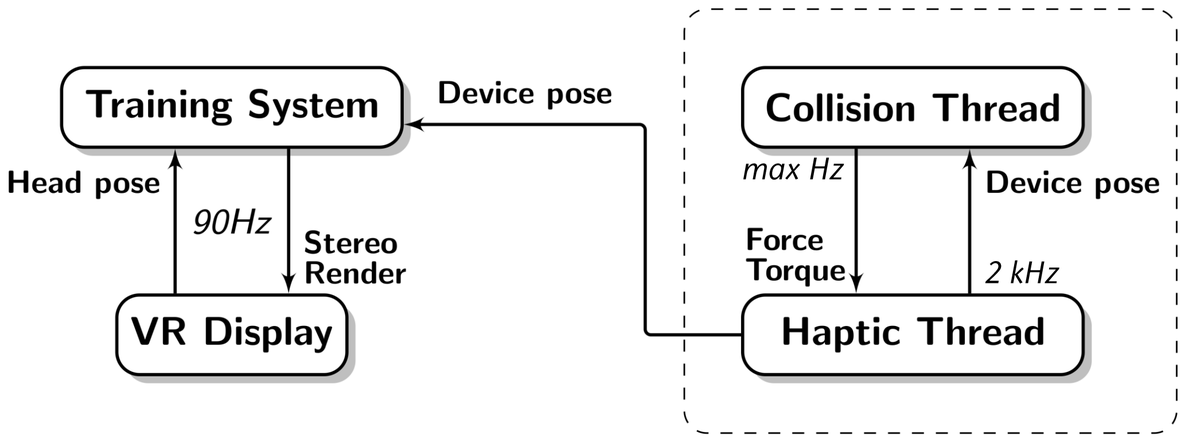




Results

- 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





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