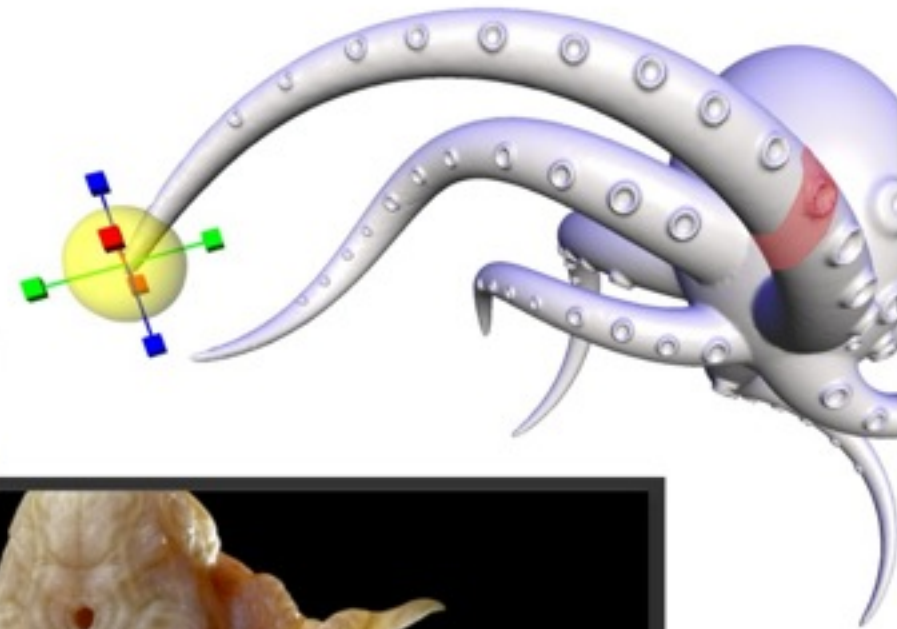




Welcome to CS838 “Advanced Computer Graphics”

Eftychios Sifakis
Fall Semester 2014

Today's lecture

- What is the class about? Is it right for you?
- Discussion of class logistics
 - Timetable, office hours, communication policies
 - Coursework and grading
 - Class materials, website and discussion forum
- Some information about your instructor
- Overview of (tentative) topics covered in class
- Learning a bit about you!

Scope

- What is the class about?
 - Gaining *exposure* to modern computer graphics principles
 - Covering fundamentals, at enhanced depth
 - Also a taste of current trends (in research or industry)
- Who is this class for?
 - Accessible by graduate students in all areas
 - Advanced (post CS559) undergrads, too
 - Prior exposure to visual computing is assumed
 - Should be somewhat comfortable with programming
 - Enthusiasm a must!

Logistics

- 3 credits, eligible for core credit (awaiting confirmation)
- Location : Psychology 121
- Meeting time : Mondays & Wednesdays 2:30 - 3:30
- Office hours : Mondays & Wednesdays 11am - noon
 - Only on days when the class meets
 - Also by appointment (email!)
- Course website : ***<http://pages.cs.wisc.edu/~cs838-1>***
 - Check for notes, assignments and reading materials
- Discussion: ***<https://piazza.com/wisc/firstsemester2014/cs838/home>***

Logistics

- Grading policy
 - 40% : Attendance, presentation & reading assignments
 - 60% : Customized project (groups of 2).
- Communication policy
 - Can email anytime - start subject line by **[CS838]**
 - At the latest, expect reply by next office hours! (usually faster)
 - Try a Piazza post, if one of your colleagues can help!
- Verify that you have received a ping from the mailing list!
 - If not, contact instructor to be added

Topics

- Modeling and geometry
 - Point-based models
 - Implicit surfaces
 - Meshing
 - Mesh optimization and processing
 - Differential geometry



Topics

- Rendering
 - Global illumination
 - Rendering equation - radiosity
 - Photon mapping
 - Image-based rendering



Topics

- Shape manipulation
 - Laplacian mesh processing
 - Shape morphing
 - Non-rigid registration
 - Parameterization



Topics

- Animation
 - Character skinning
 - Facial animation
 - Motion editing and control
 - Performance-driven animation



Topics

- Dynamics
 - Cloth animation
 - Contact & collision
 - Rigid body simulation
 - Intro to fluids simulation



Topics

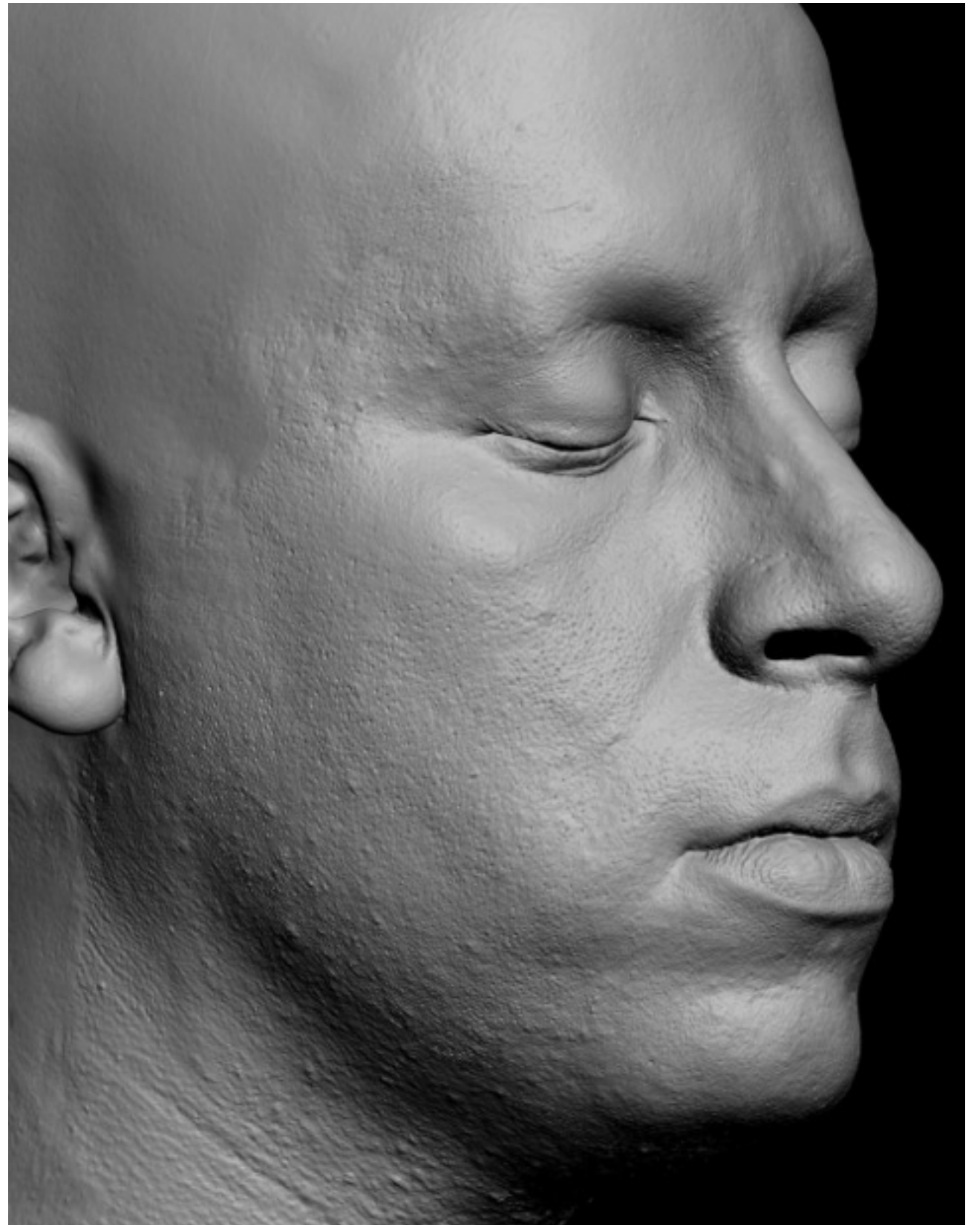
- Various cool stuff
 - Sound modeling
 - Interactive rendering
 - Shape synthesis
 - General-purpose GPU use



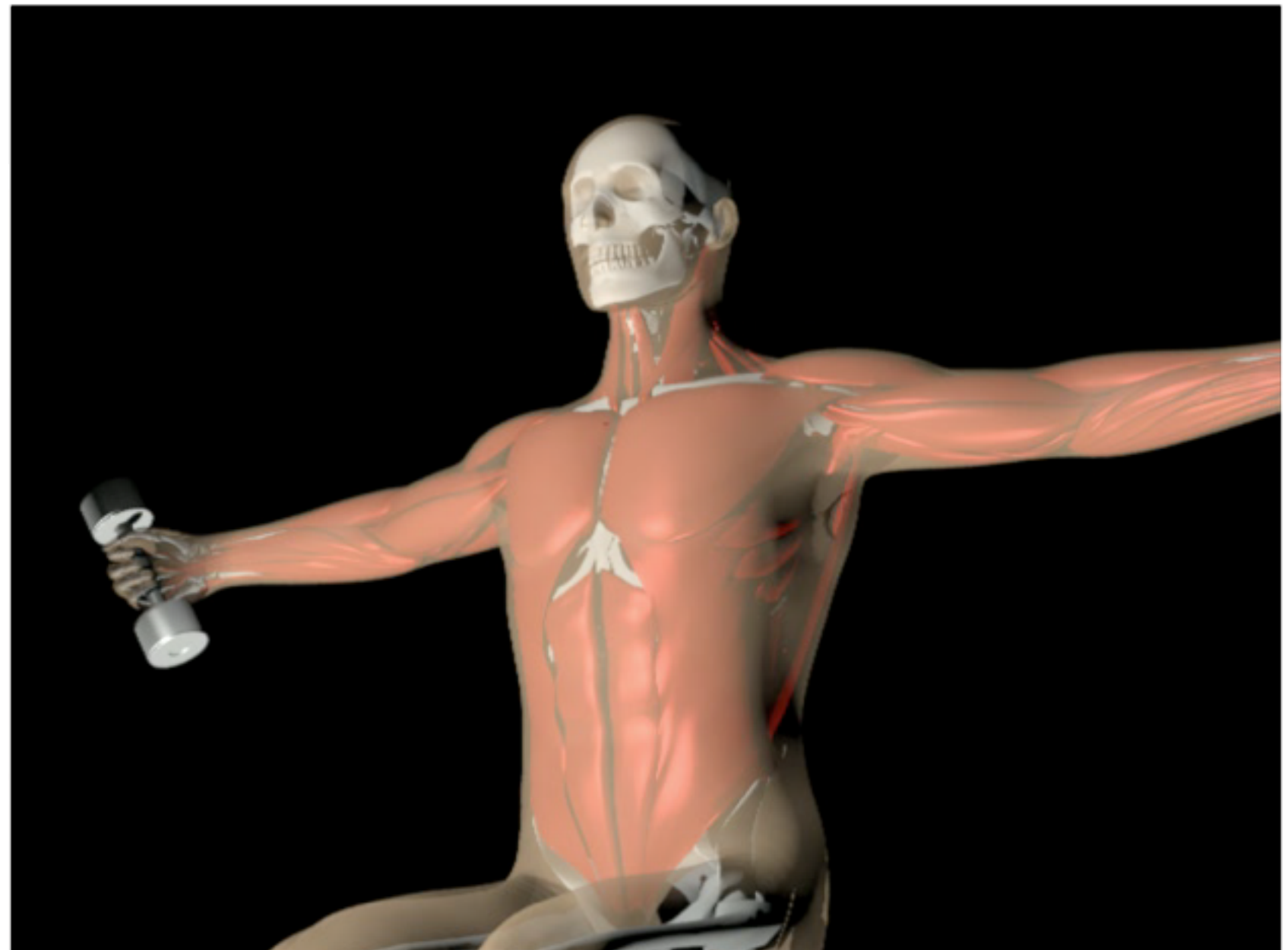
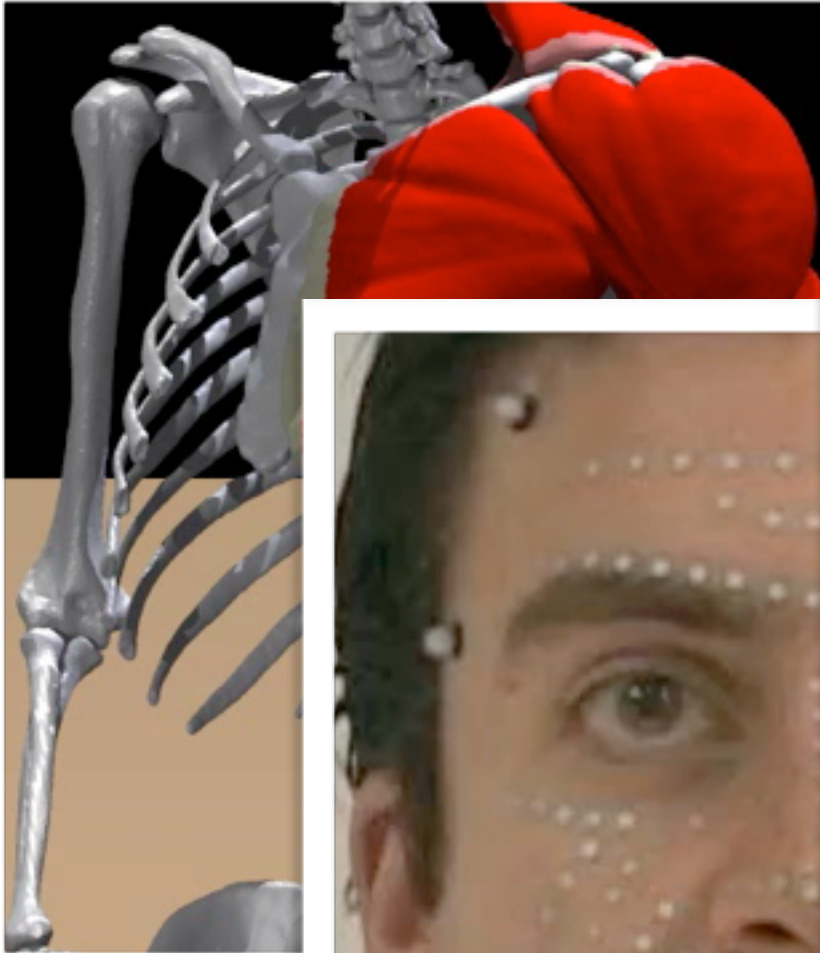
About your instructor ...

Research interests:

- Physics-based modeling
- Digital humans
- Simulated elastic objects
- Fluid animation
- Fracture & destruction
- Fast math in general



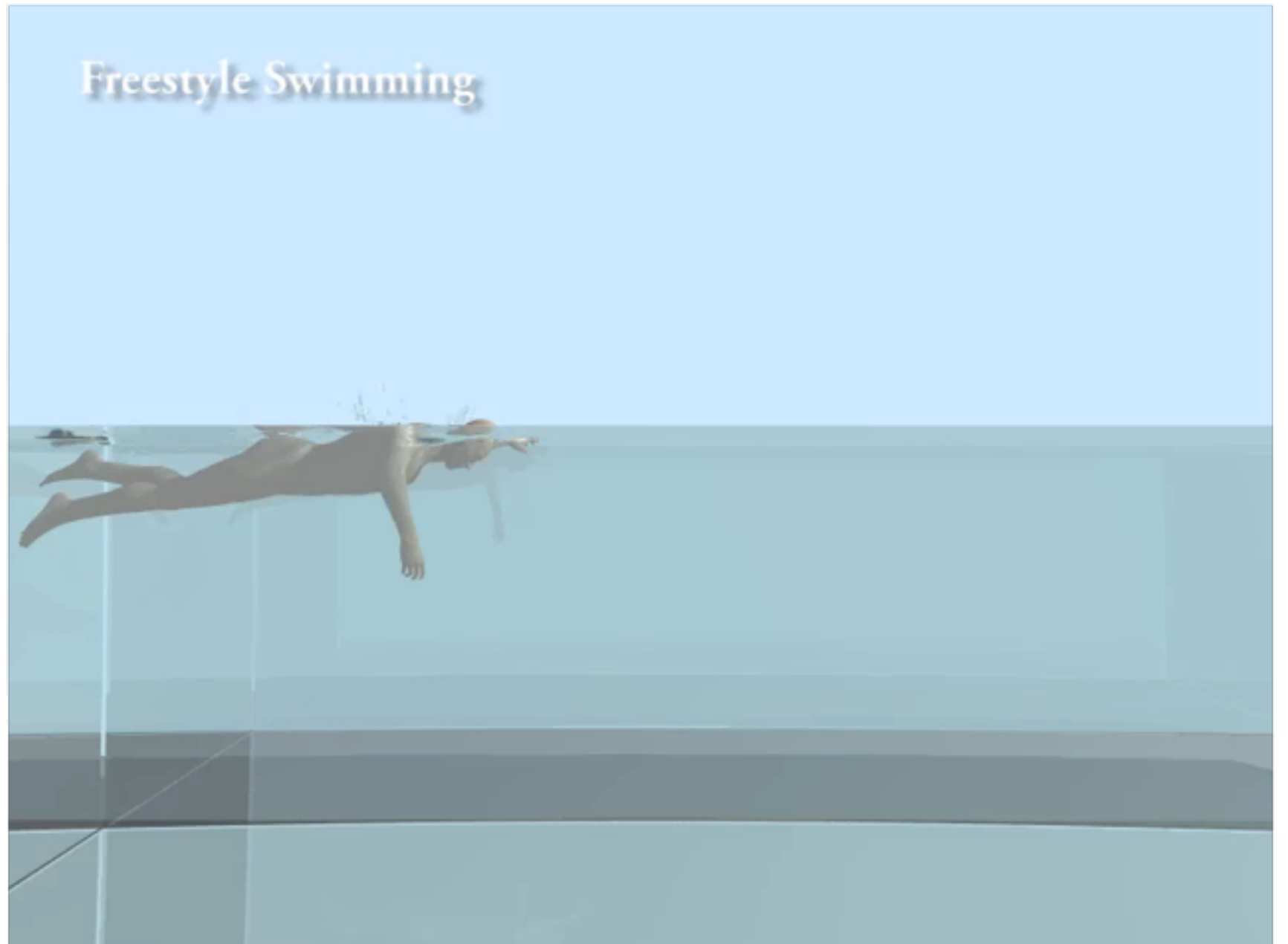
Animating models of human bodies



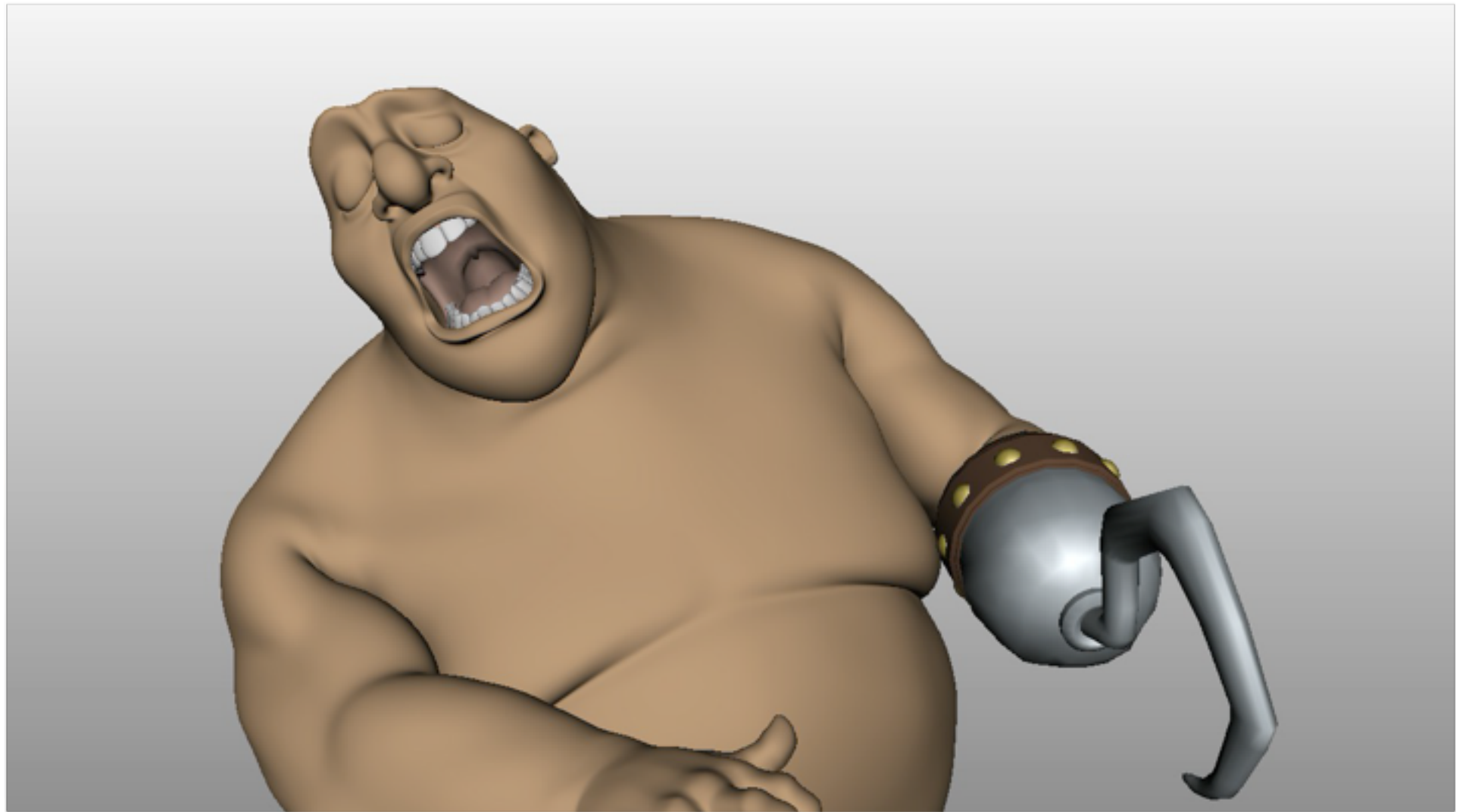
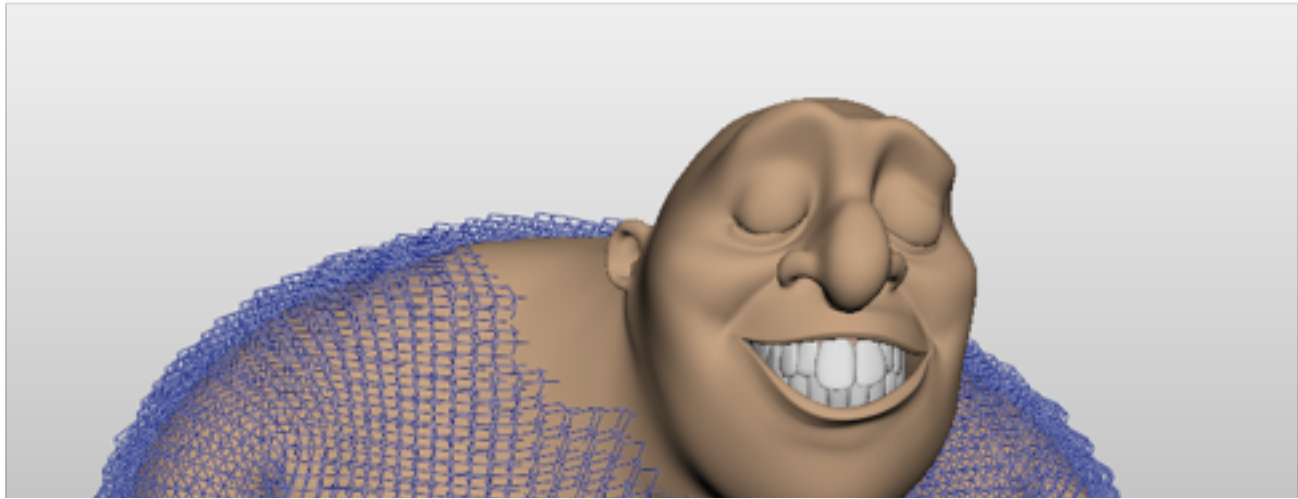
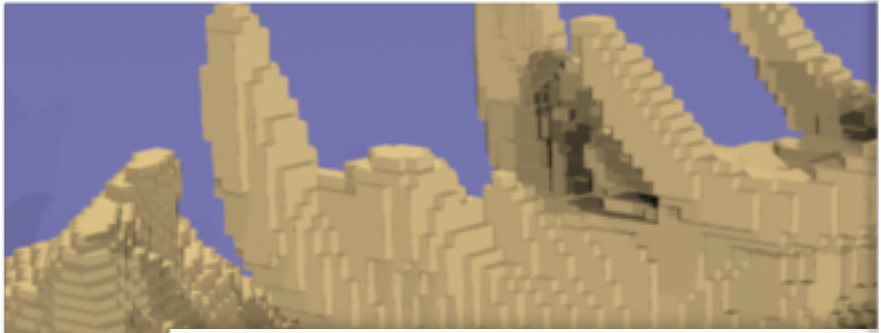
Detailed anatomy and complex environments



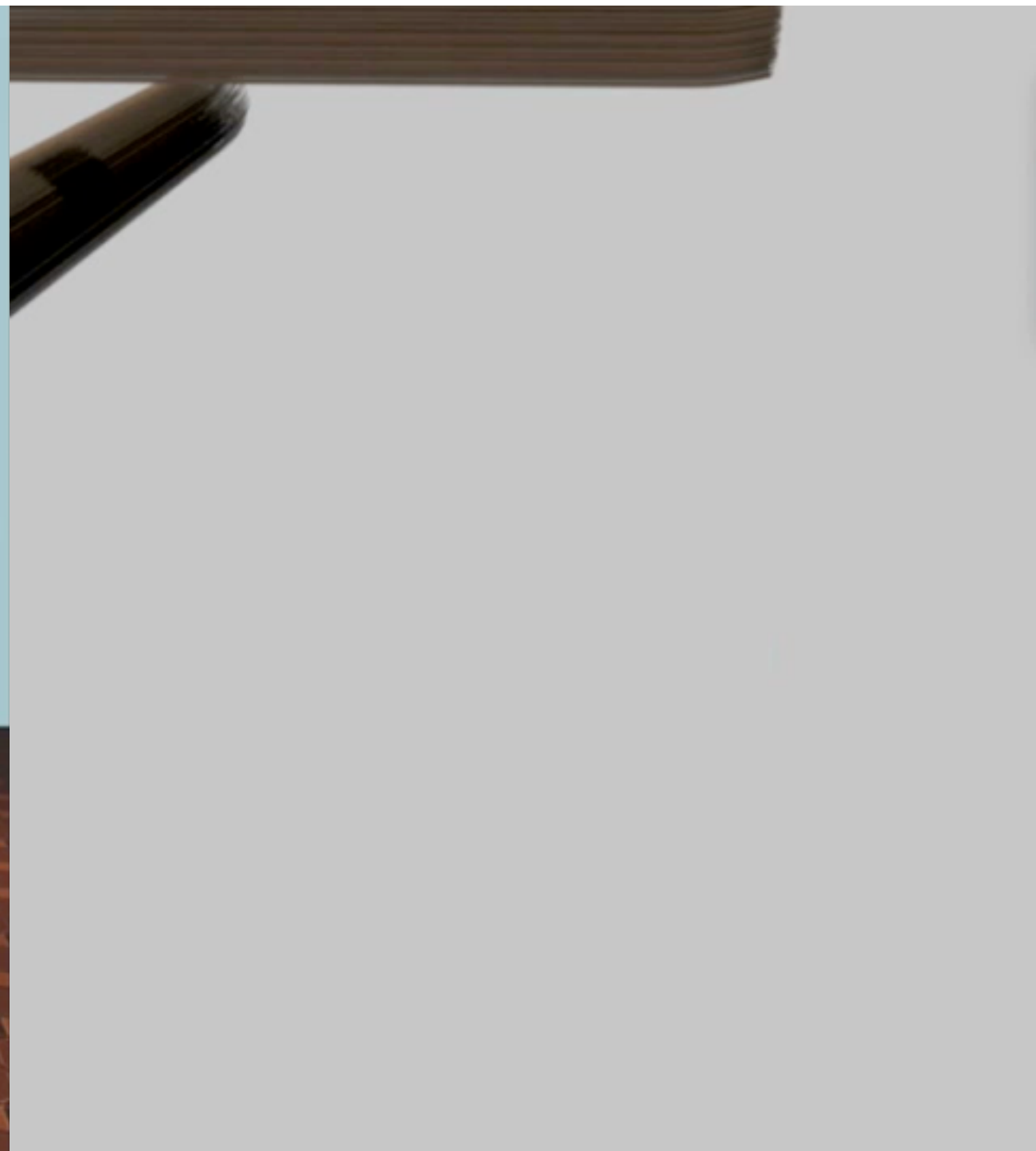
Freestyle Swimming



Jiggly deformable models & fast simulation



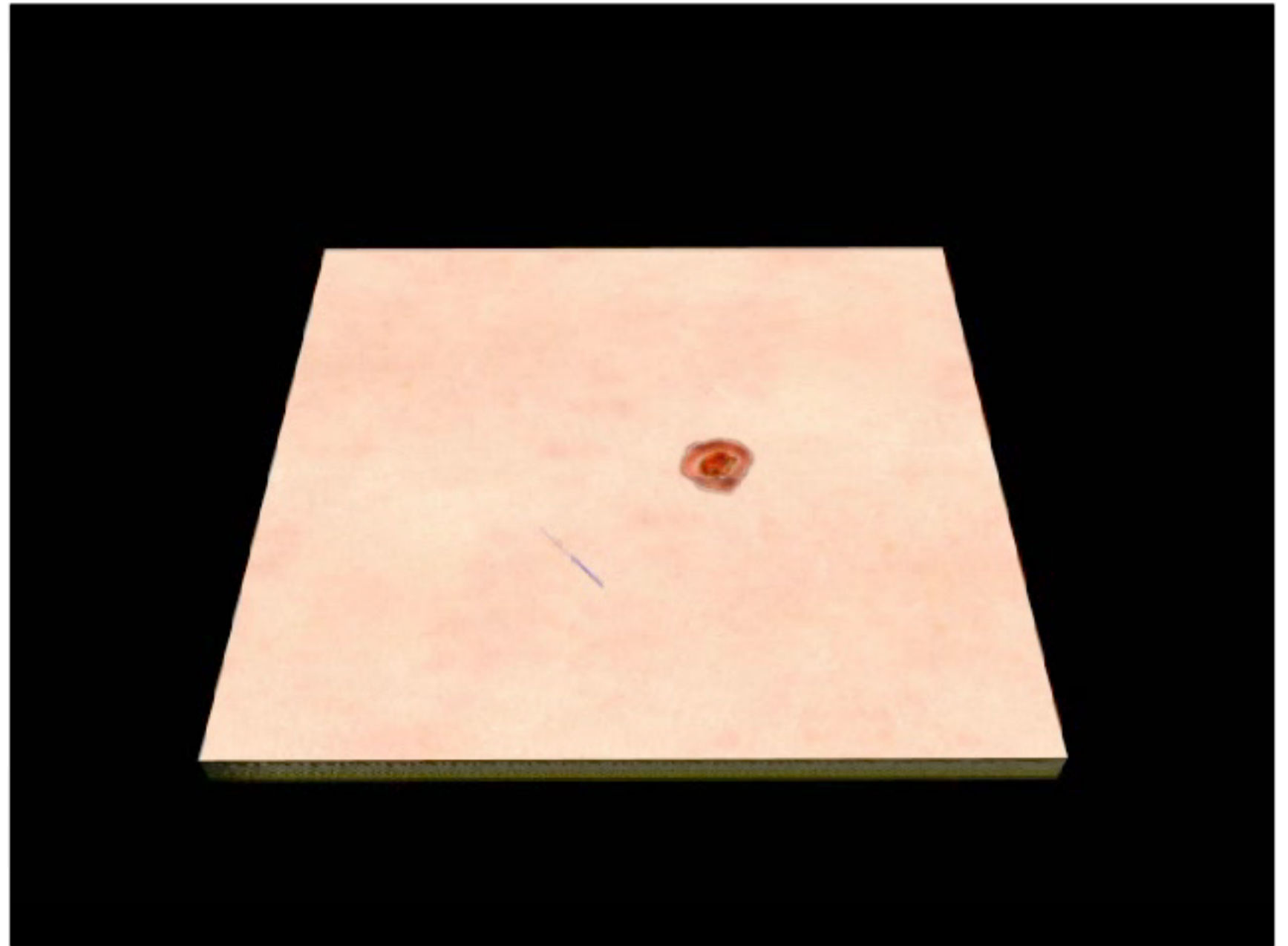
Hairy & messy collisions



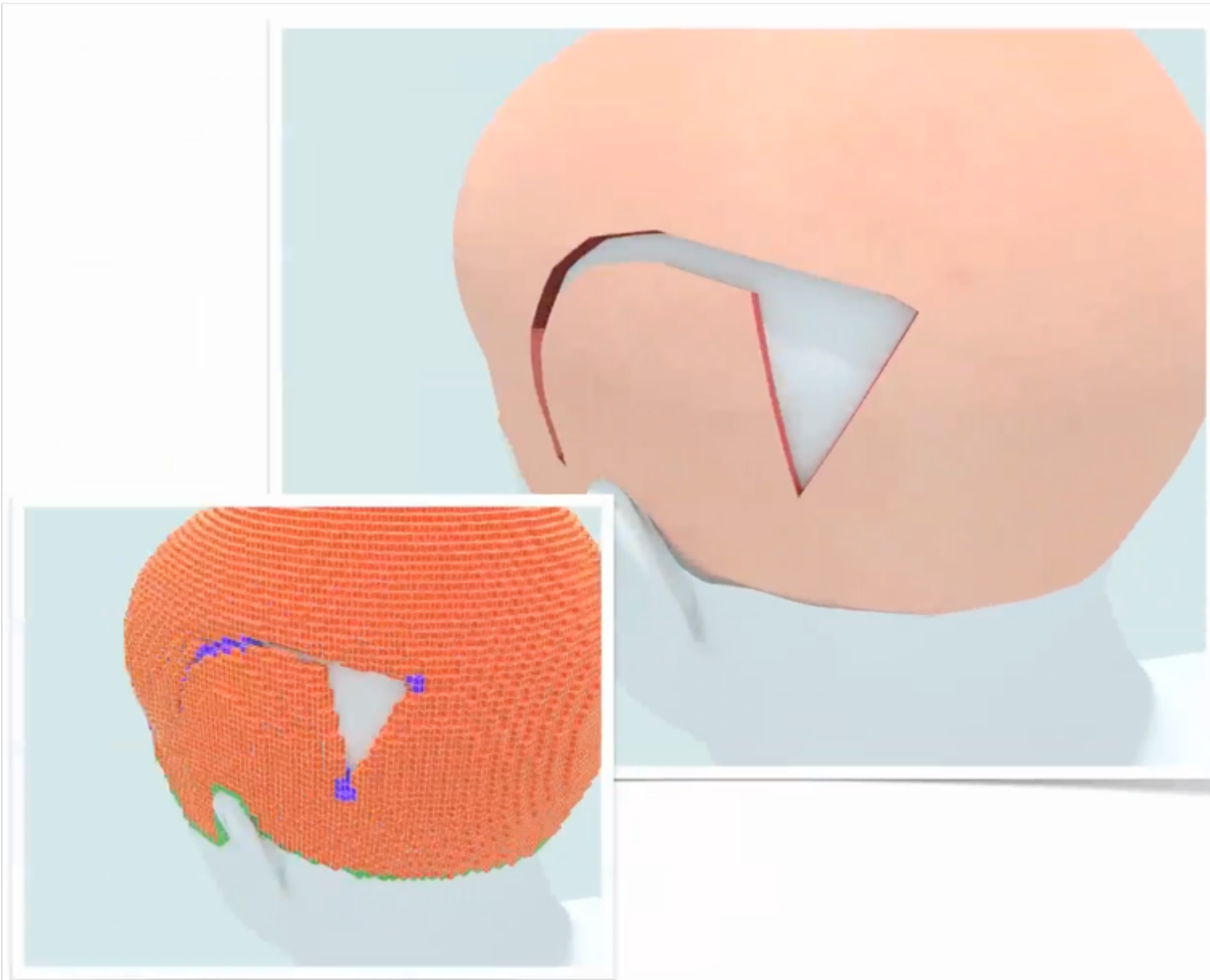
Fracture, destruction & mayhem



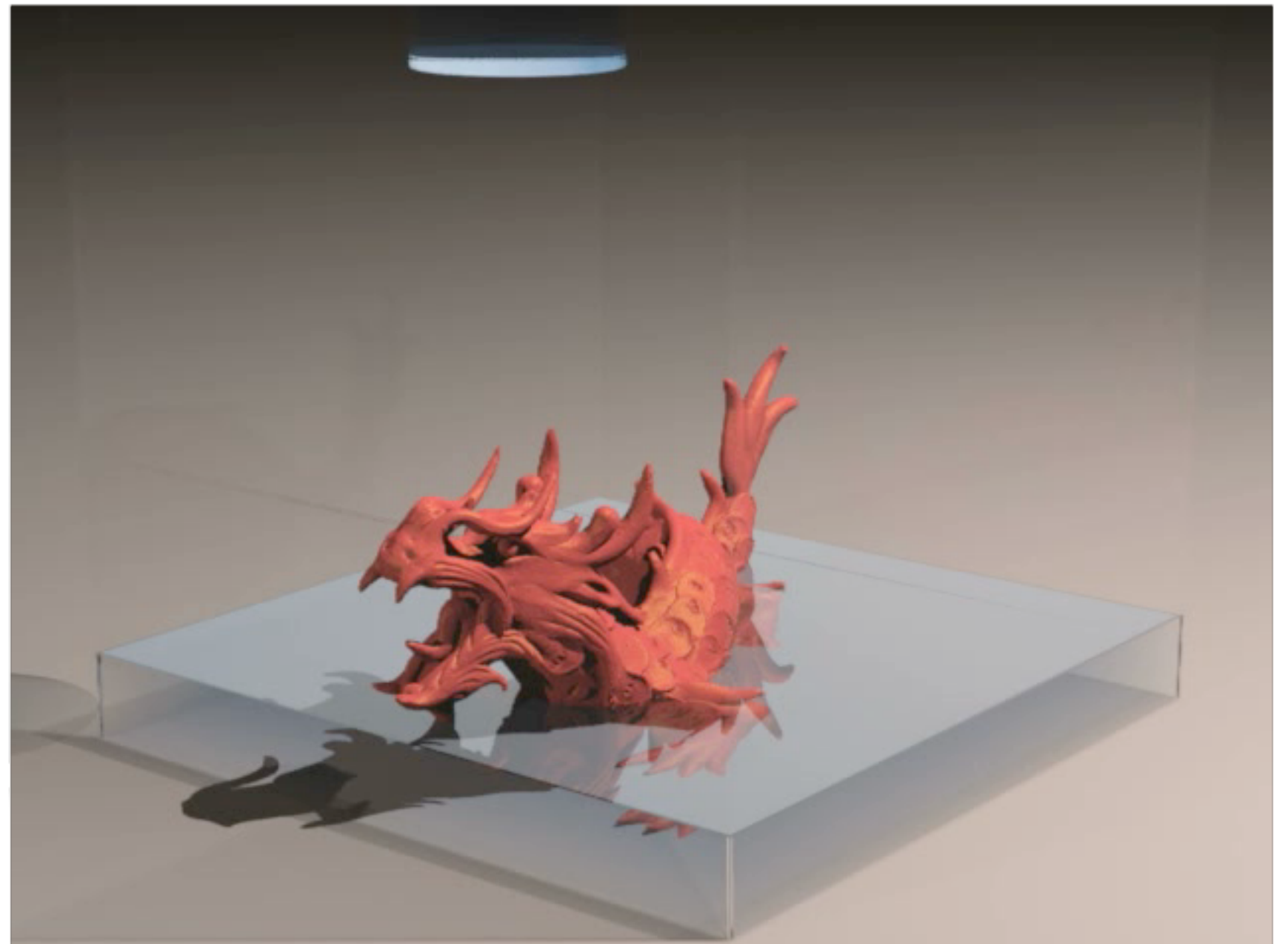
Clinical “skill simulators”



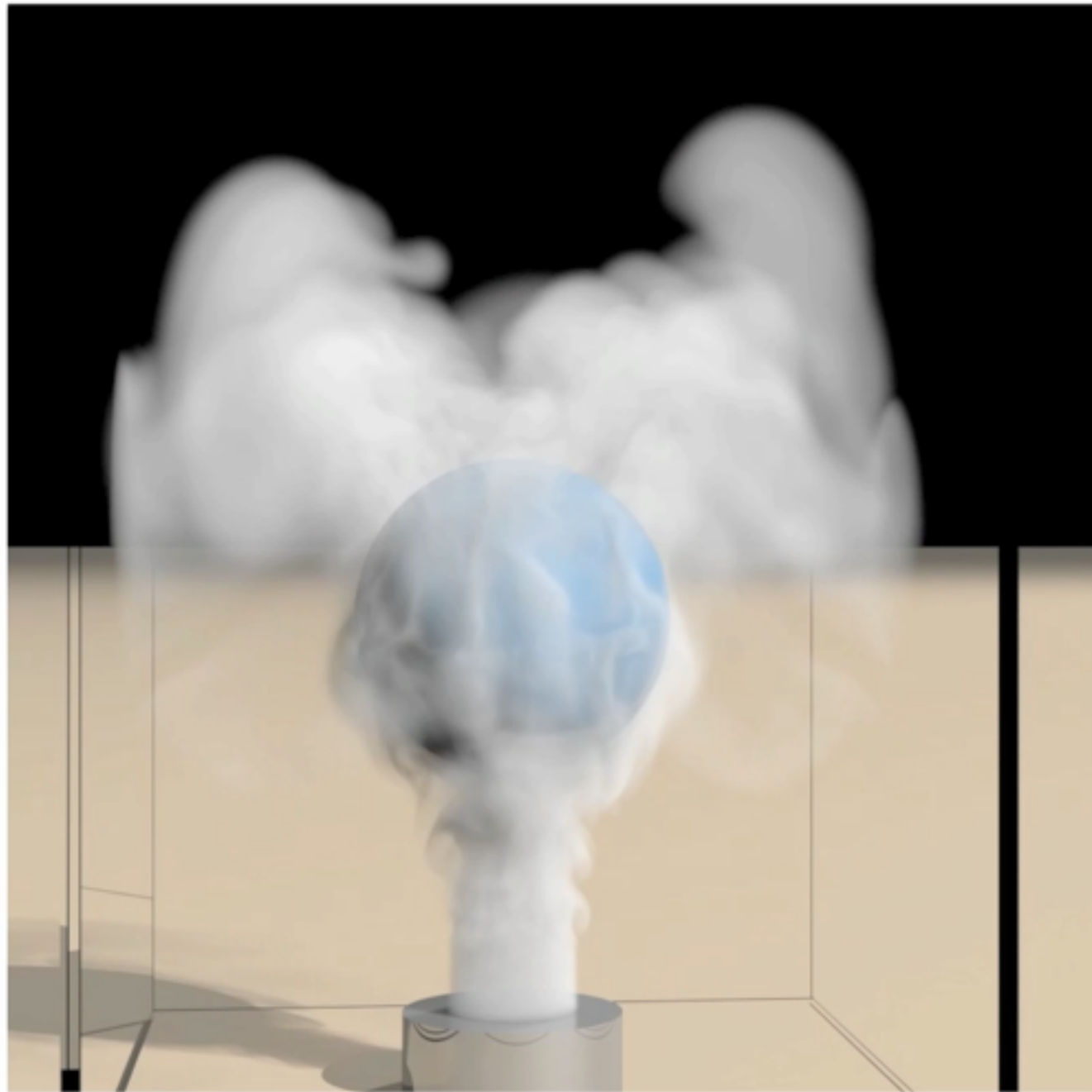
Clinical “skill simulators”



Smoke on the water



... and as much detail we can afford



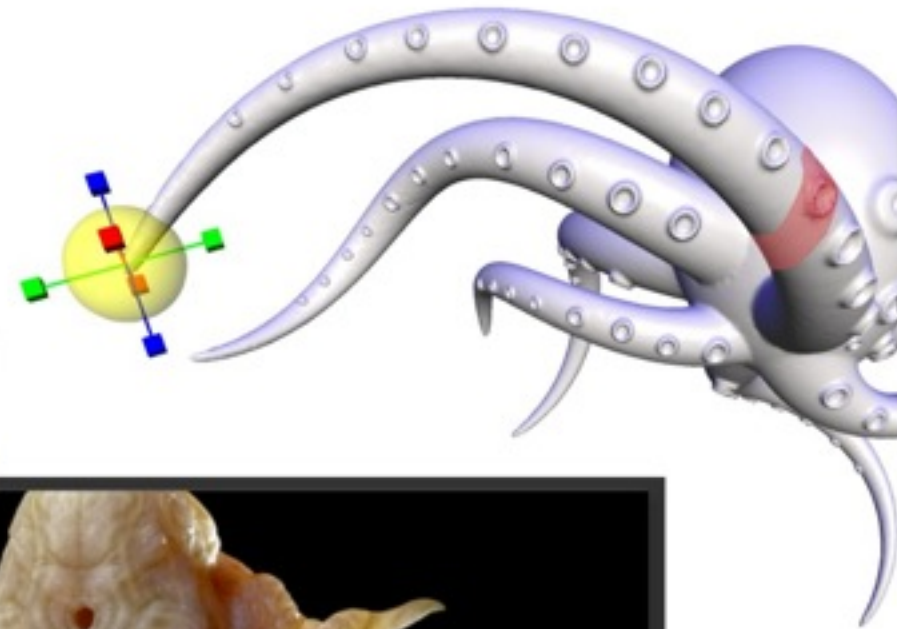
Smoke flow
past sphere

Effective
resolution:
1Kx1Kx2K

135M active
voxels

What about you?

- Your background?
 - Stage in grad/ugrad program?
 - Areas of interest?
 - Favorite classes?
 - Exposure to research?
- <insert wish list here>
 - Why interested in graphics?
 - What do you seek in CS838?
 - Excited about specific topic?



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