# SIGGRAPH2007

# Rigblocks: Player-Deformable Objects

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Maxis, Electronic Arts

# Spore: Recap

- Want players to be able to create key parts of their game
- Pollinate player-created things via servers, so your game is made of both your own creations and others'
- Richer experience, less art work(!)

# Spore: Recap

- Players create game assets
- Creatures, Buildings, Vehicles...

# How can players create models?

- Let player use supplied parts to build model
  - Allow stacking, pinning, sliding
- *But*, static is boring, requires many blocks to be expressive. So
  - Add animations that *deform* blocks
  - Animations driven by player-controlled handles
- Result: Rigblocks, our LEGO(tm)(R)(whatever)

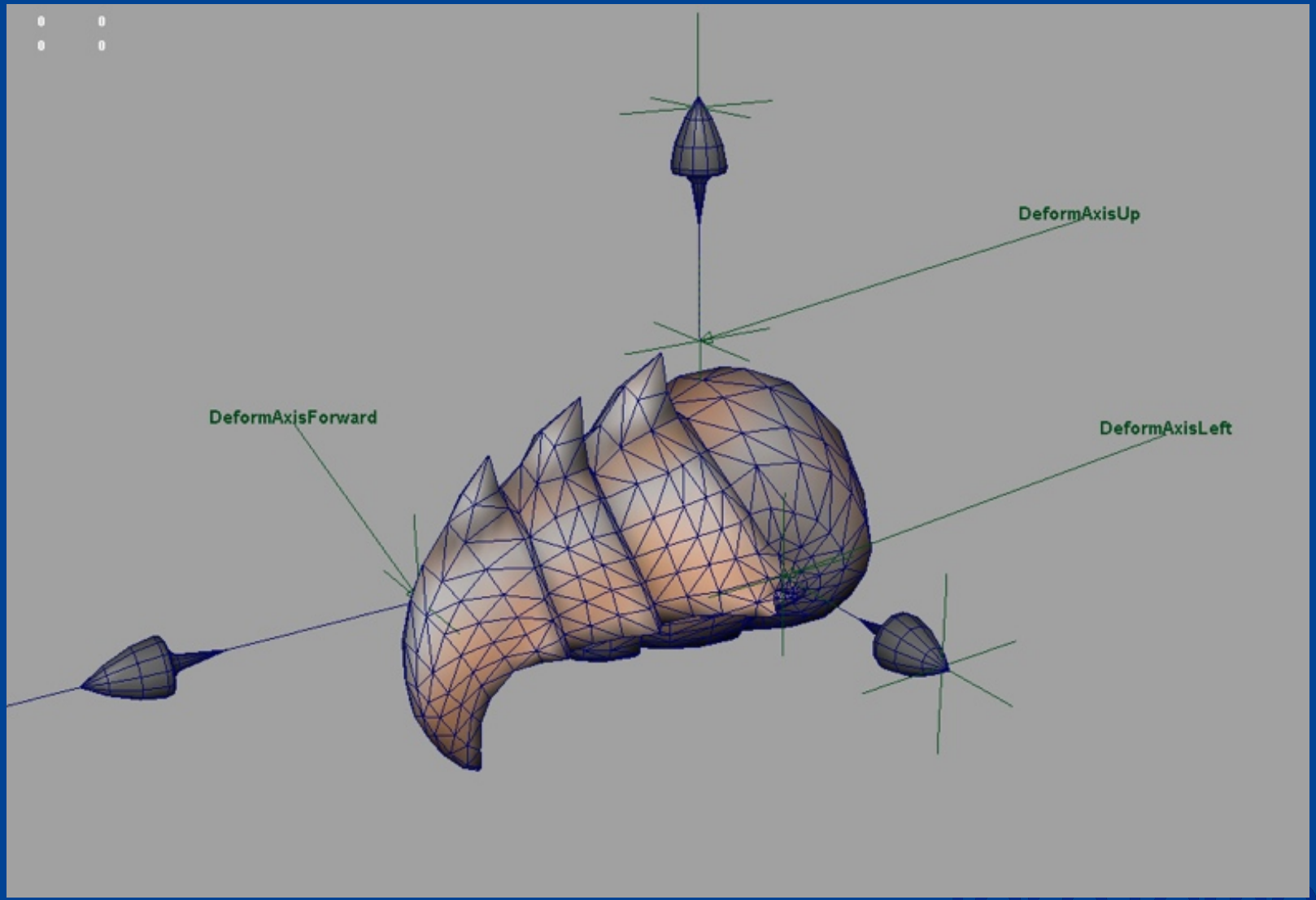
# Advantages

- Player interaction with the block is intuitive and straightforward
- Rigblock deformations are expressive
- Provides a balance between enabling player creativity and amplifying player creativity

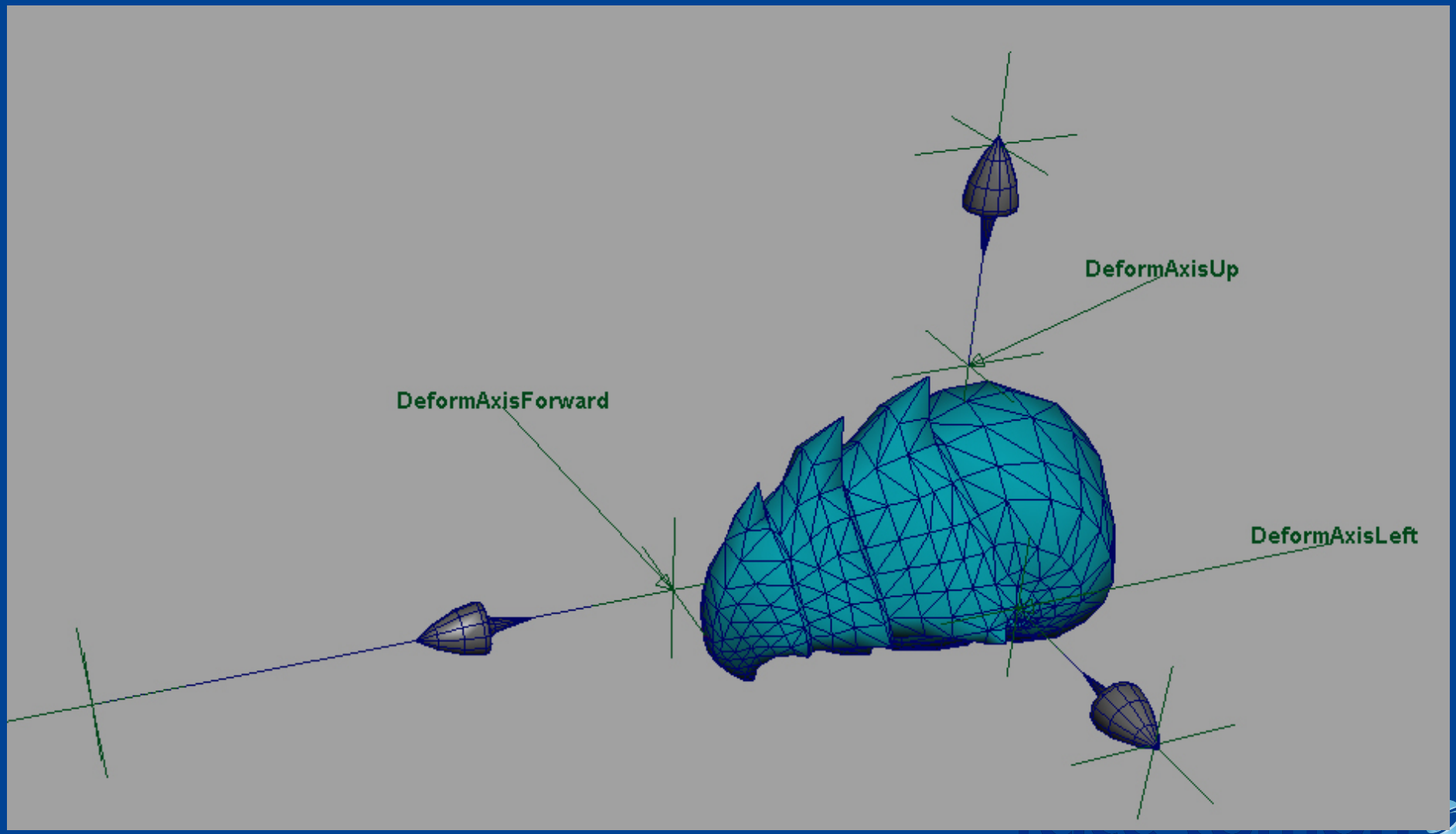
# Advantages

- Aiming for the sweet spot between:
  - High-quality, artist-created models, with no player control
  - Lower-quality, effort-intensive, wholly player-driven approach, such as providing a sculpting tool.

# Example: Maya Model



# Animation Deforms Mesh



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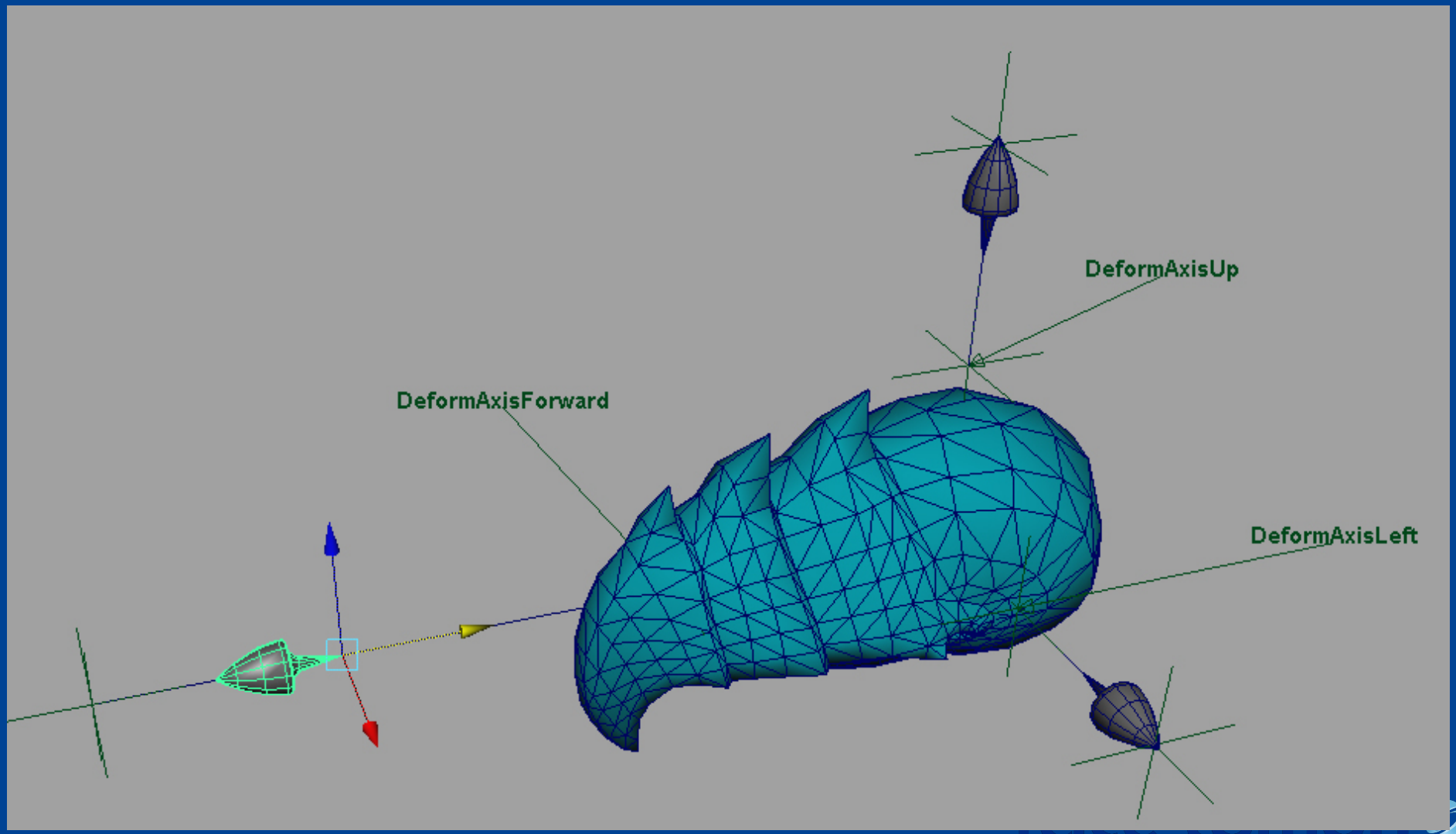

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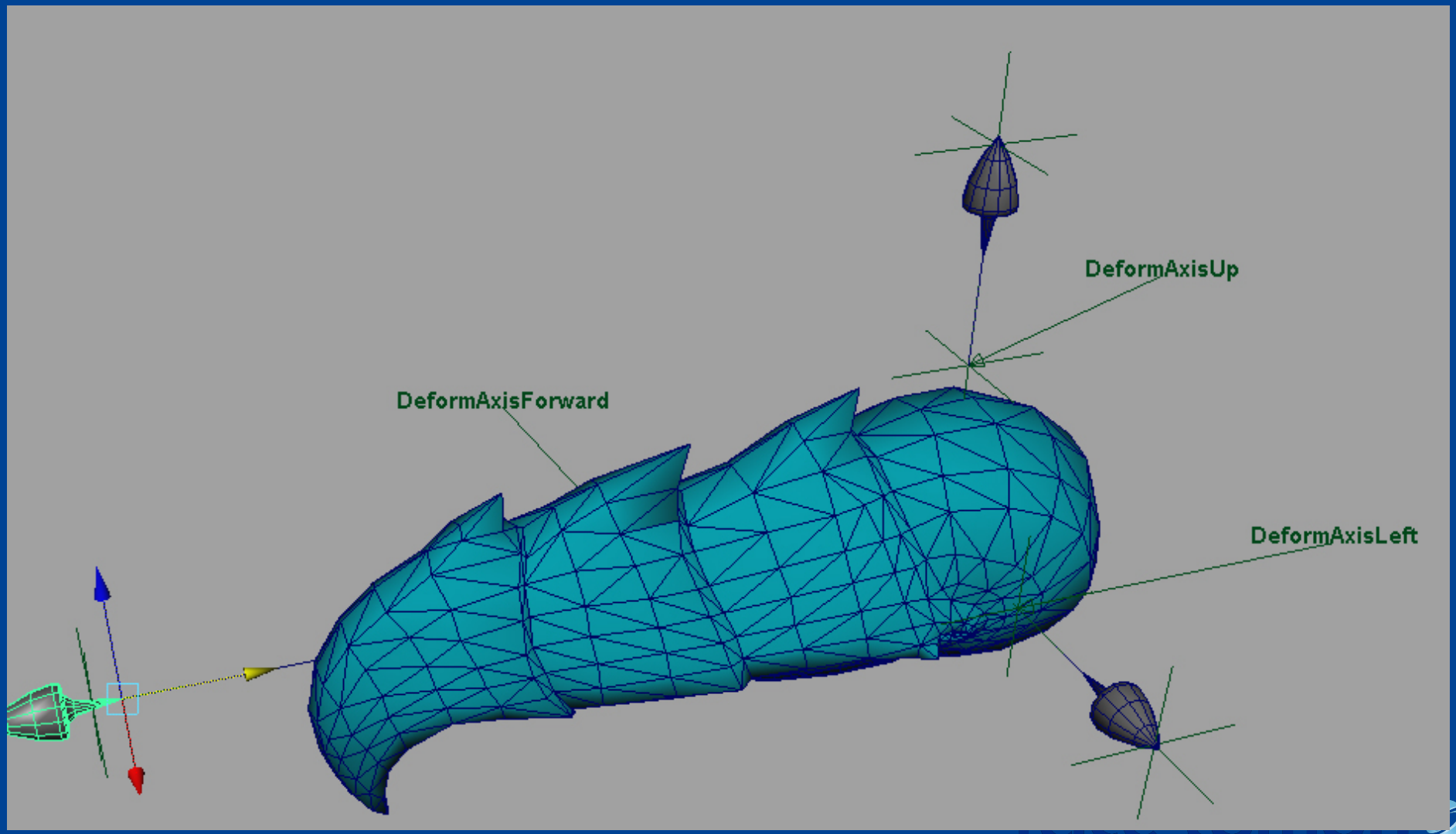


# The Editors

Demo

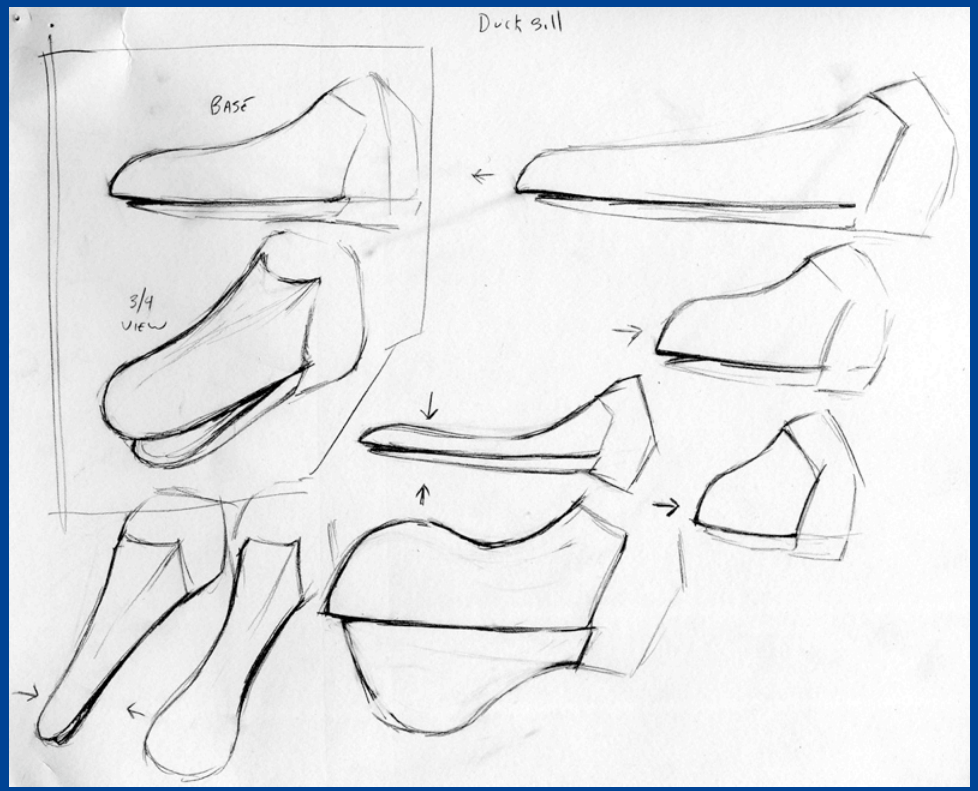
# Note: Creatures

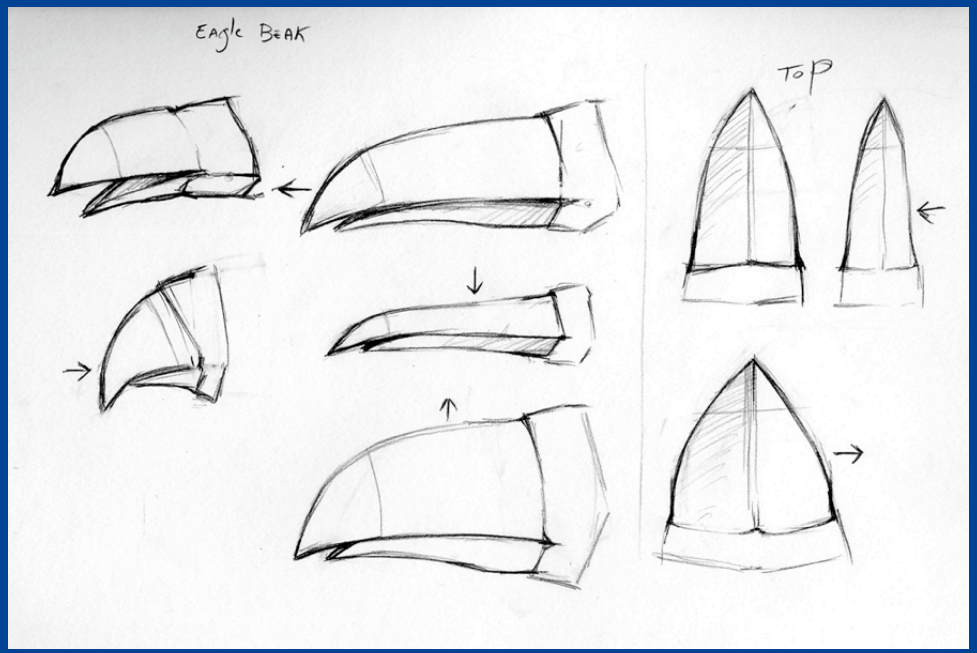
- Base block is a special block: **body mesh**
- Allow player control over a basic skeleton
  - Adjust spline, glue limbs
- Mesh generated via metaballs
- Rigblocks attached to body

# Storyboarding

# Storyboarding

# Storyboarding: A Single Block



# Pipeline

- Standard workflow: separate author file per animation
- Rigblocks: Multiple animations, so use track editor
- MEL scripts control addition of handle rigs
  - Handles drive animation! (Via expressions)
  - Artist places handle, so can iterate in-Maya

# Animation Technology

- Can't use standard animation blending

  50% Def_A + 50% Def_B != Average(A, B)

- Use cumulative blending from rest pose
  - Match Maya by composing deform matrix at end from separately accumulate scale, rotate, translate
- Multiblender
  - Handles standard "runtime" animations
  - Applies deforms on top

# Baking

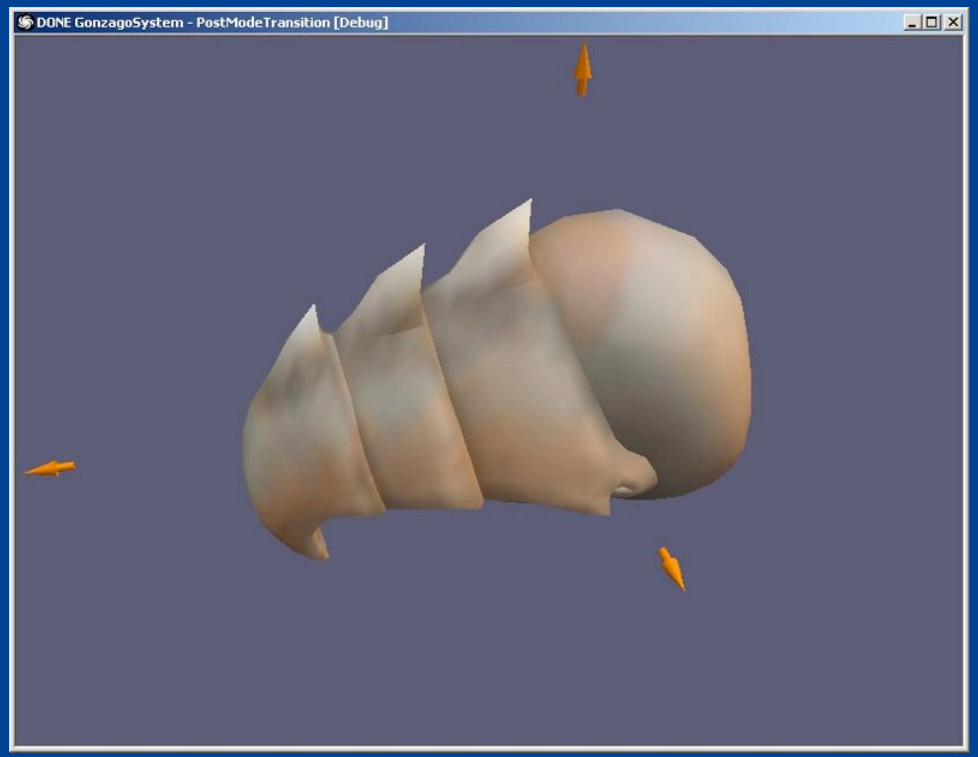
- Remove all deform animations, producing a new base mesh
- Model must be able to be rendered at game rates
  - Single texture page, single material
  - Generate LODs

# Baking: Animation

- Desirable for blocks to carry “runtime” animations through (e.g. mouths)
- But such rigblocks must be substituted with low-bone-count versions
- Requires retargetting composite deform pose to new runtime skeleton (base pose has changed)

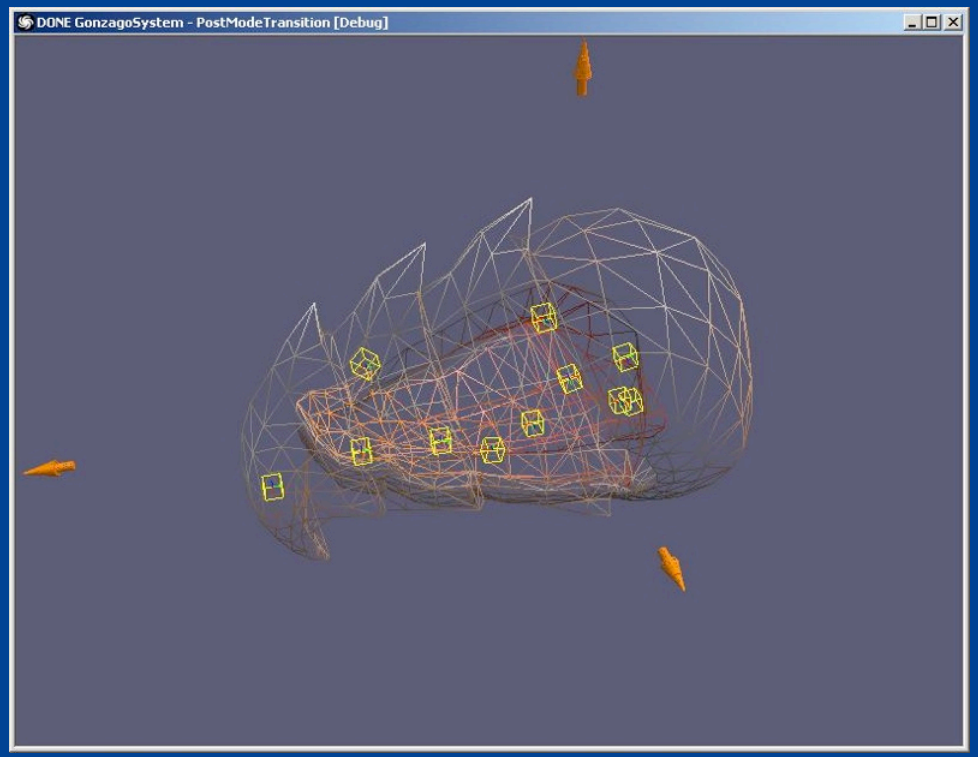
# Runtime Animation

## Authored Block



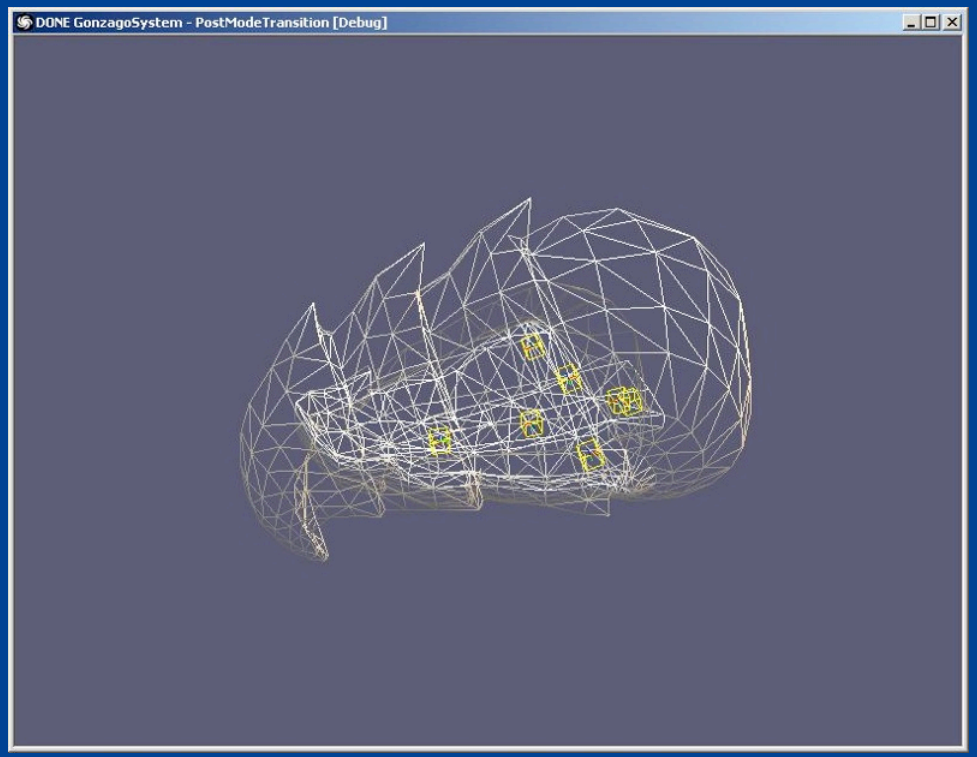
# Runtime Animation

## Authored Block




- Many bones
- Skeletal animation
- Blendshape animation

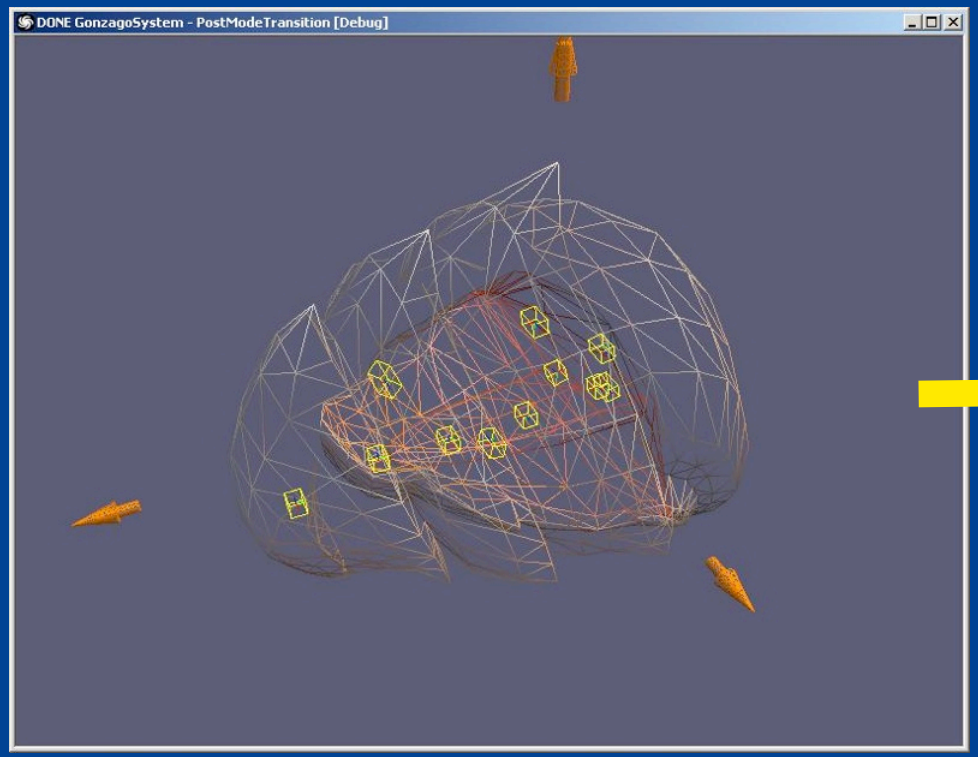
## Runtime Block




- Reduced skeleton
- Skeletal animation

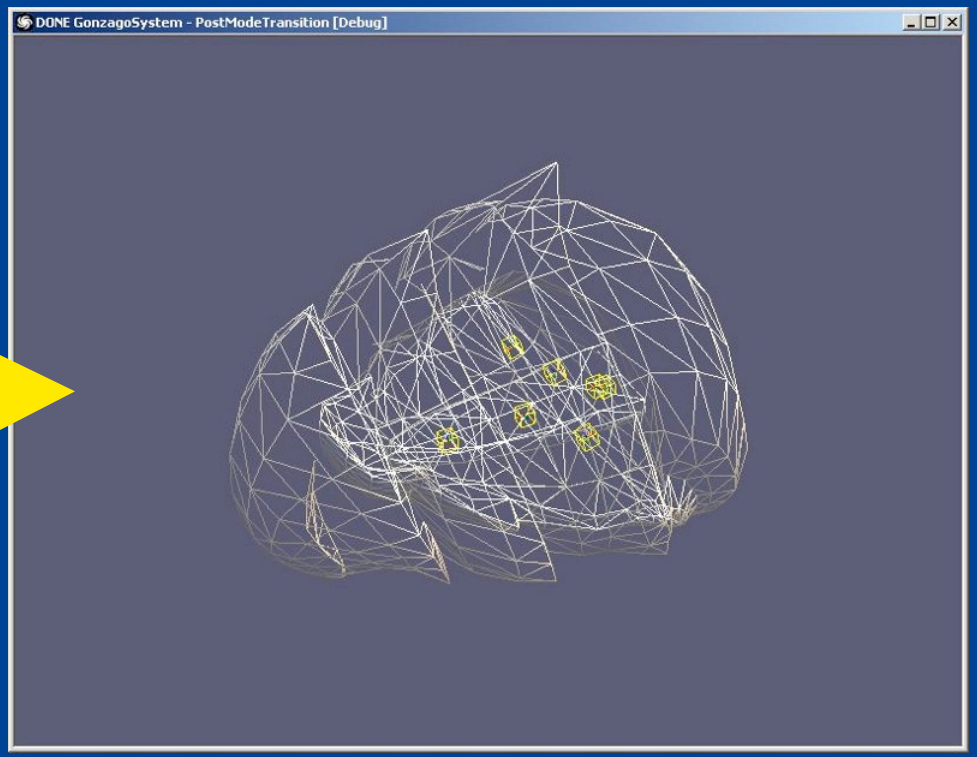
# Runtime Animation

## Authored Block




- Apply deformation handle

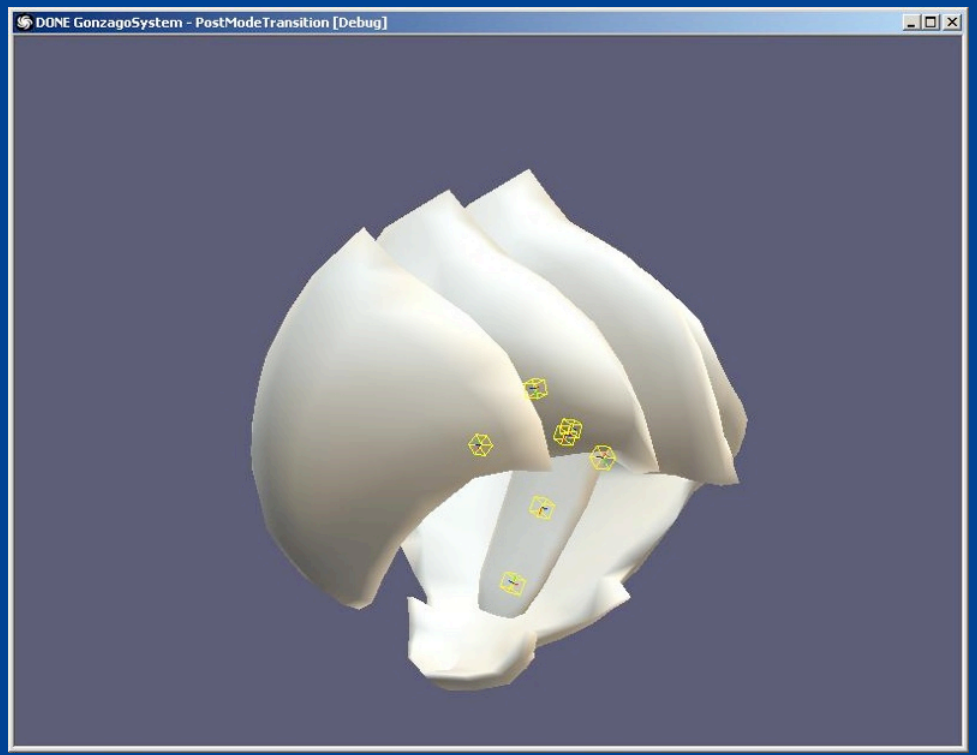
## Runtime Block




- Mesh is retargeted to new (runtime) skeleton

# Runtime Animation

## Runtime Block




- Runtime animations are retargeted to new skeleton

# Thanks


- All the Rigblock artists
  - Umaru Jalloh, Mike Khoury, Ferby Miguel, Jane Ng, Holly Ruark, Matt Small
- The Editor team
  - Dave Culbya, Chaim Gingold, Alex Lam, Dan Moskowitz

# Questions?