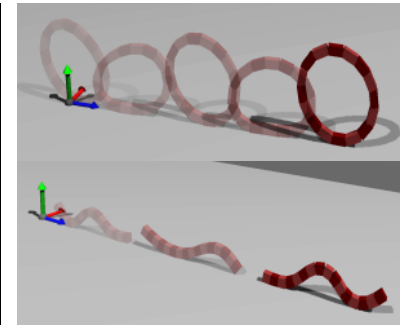# IMAGINE
Intuitive Modeling and Animation for Interactive Graphics & Narrative Environments

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EN INFORMATIQUE
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INRIA
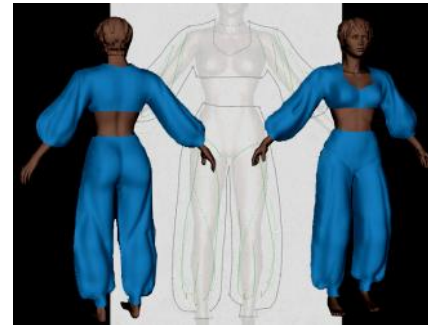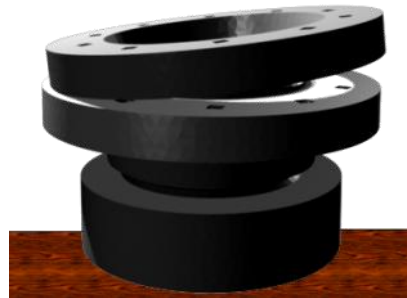
A Computer Graphics group
3D modeling, Animation, Cinematography

- A pluridiscilinary team
    - **Marie-Paule Cani** (Prof computer science Ensimag/ INPG)
    - François Faure   (Prof computer science UJF) → UBC Vancouver
    - Stefanie Hahmann (Prof applied-math, Ensimag / INPG)
    - Jean-Claude Léon (Prof mechanics, Ense3/ INPG)
    - Olivier Palombi   (Prof in anatomy ,UJF)
    - Damien Rohmer   (MdC CPE Lyon)
    - **Rémi Ronfard**   (CR1 INRIA)

- 12 PhD students
- 5 research engineers
- Administrative assistant : Laurence Gudyka

Hallway H
Second floor
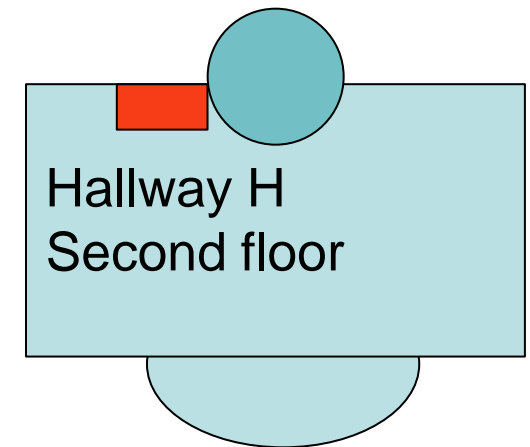
Intuitive Modeling and Animation for Interactive Graphics & Narrative Environments

Major Issue : demand for more and more complex scenes

- Armies of Computer Artists during several years?
- Or automatic creation … with little control ??

Scientific focus: Creation tools for animated virtual worlds

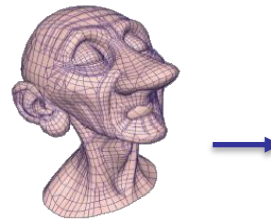- Applications to films & games, engineering, other sciences, general public
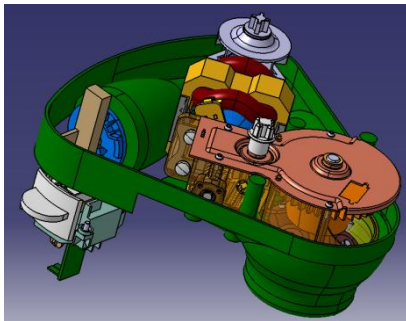
Practice in the film industry

Best research results quickly available but…

- Artists do as much as they can WITHOUT computers

  Shape, motion, stories are drafted on paper, clay, etc.

Design stages   Digital stages

[Pixar, « Geri's game »]

Standard software
- Direct editing of DoF (NURBS, subdivision)
- Years of training
- Spoils creativity!

Grand challenge?

"Make tools as transparent to the artists
as special effects were made transparent to the public!"
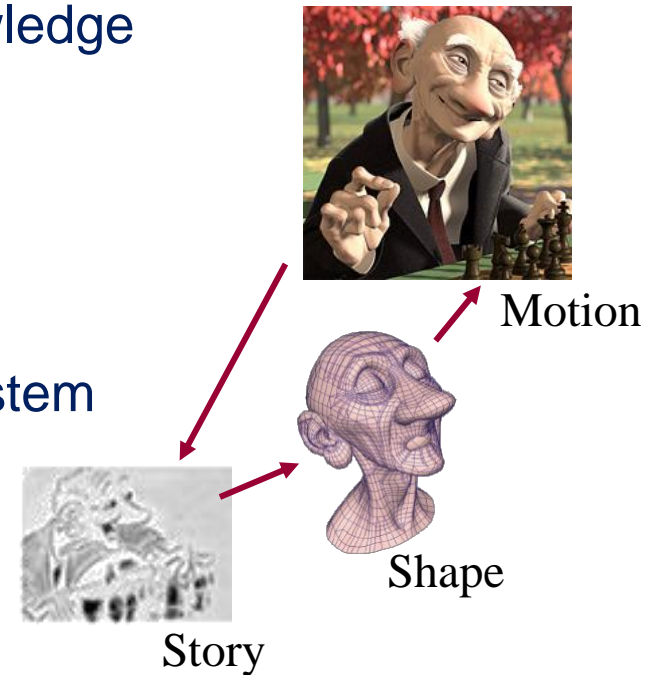
[Rob Cook, Technical director Pixar, 2009]

User-centered perspective on **shapes & motion**

- High-level models embedding a priori knowledge
- Generate details from minimal user input
- Advanced transfer and editing tools

Creating interactive virtual prototypes

- Designing & experimenting in the same system
- Natural interaction gestures
- Real-time response

Long term Vision

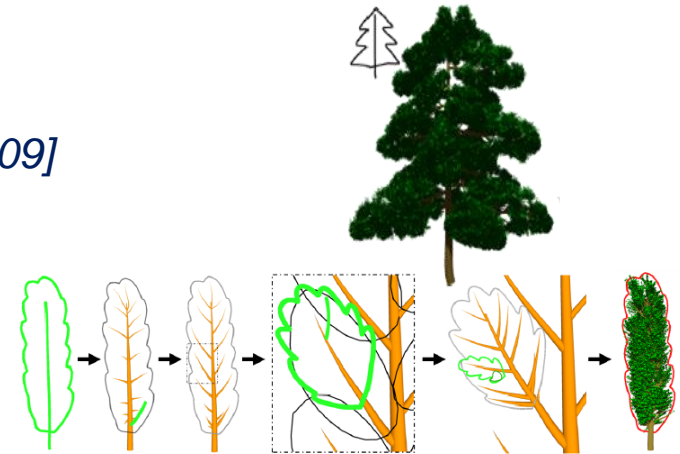*"Magic pen" to seamlessly create shapes, motions & stories*

Motion

Shape

Story

Combining sketching & knowledge

Applications: quick prototyping for other sciences & education

- Structure from silhouettes for trees *[EG 2009]*

  - Sketching from coarse to fine
  - Automatic details propagation
  - A priori knowledge (plant biology)

- Virtual blackboard for teaching anatomy *[SBIM 2010]*

  - Complex sketches with occlusion
  - Anatominal sketching conventions
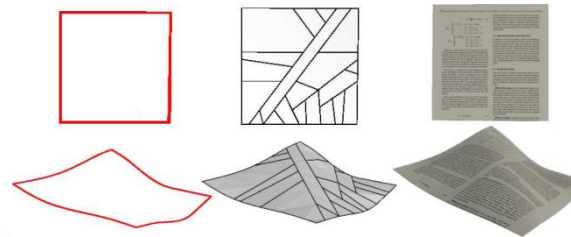 - A priori knowledge (vascular systems)
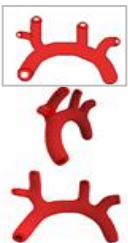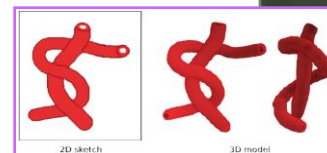
Imagine

Wrinkling cloth & paper
Applications to films & games

Paper from contours *[short EG 2011]*

Wrinkling cloth *[Siggraph Asia 2010]*

- Coarse simulation
- Measuring compression
- Adding geometric wrinkles
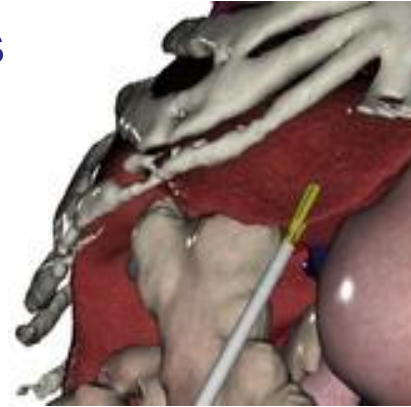 (implicit convolution)

Input Simulation   Our results

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Real-time simulation
Applications to virtual anatomy & CAD

Imagine

- Non-standard simulation methods
- GPU-based collision processing

[SIGGRAPH 2010]

*[SIGGRAPH 2011]*

3 affine frames, 10 samples, 500Hz

[SIGGRAPH 2012]
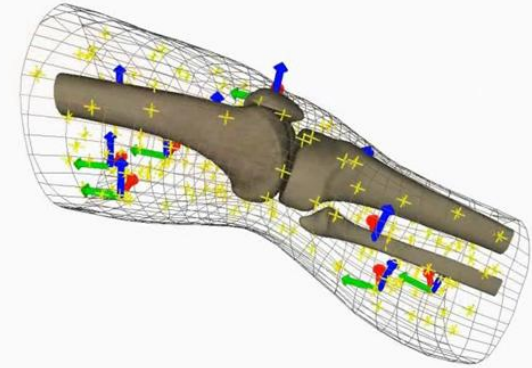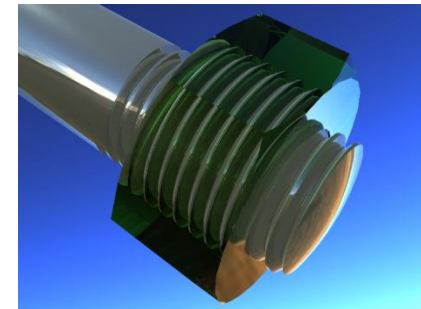
Interactive virtual prototyping in various domains

- Civil & mechanical engineering

- Natural sciences
  - Virtual anatomy: ontology, 3D modeling & animation
  - Plants: high level representations for plants geometry

- Art, communication & education
  - Interactive tools for education
  - Design tools for artist and the public
  - Theater: virtual staging & rehearsals

- Films & games
  - Real-time, plausible clothing
  - Virtual cinematography & film editing
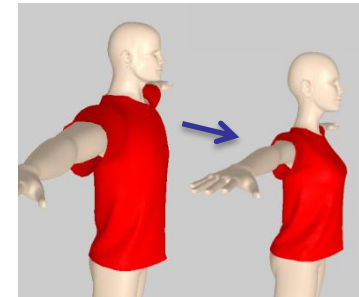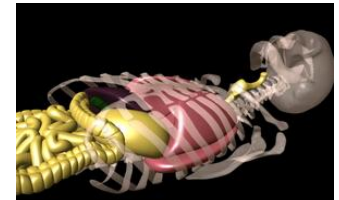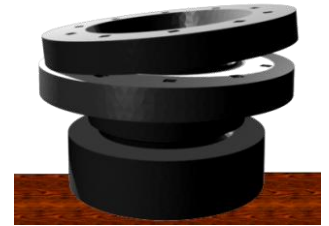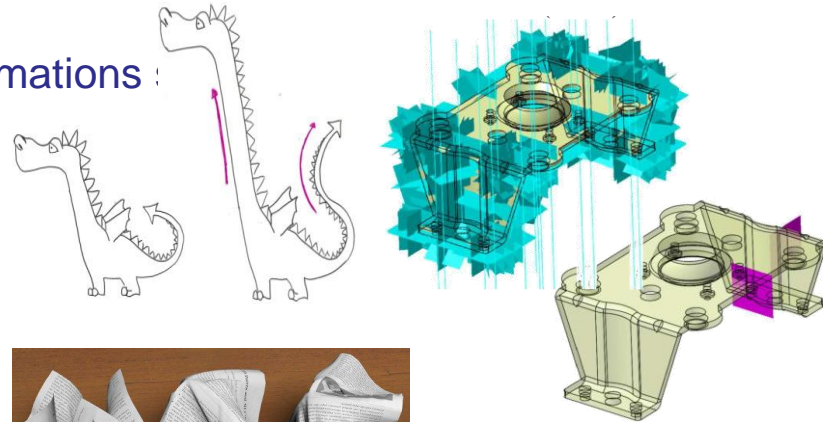
Examples of master Projects
http://imagine.inrialpes.fr/positions/positions.html

Geometry

- Sketch-based modeling / detail preserving deformations
  Stefanie Hahmann, Damien Rohmer ,MP Cani

- Shape symetry analysis and editing
  Jean-Claude Léon

Animation

- Animation of creased paper (*Damien Rohmer*)

- Collision detection and response *(François Faure)*

Cinematography & Narrative design

- Coarse to fine, knowledge-based motion synthesis
  Rémi Ronfard, Olivier Palombi

- Movie and script alignement / film narratology
  Rémi Ronfard