

An Introduction to Computer Graphics

Lectures:

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Web: http://www.cs.sdu.edu.cn/~baquan/course/F15_CG.htm

Organization



- Schedule
- Textbook (s)
- Grading

Traditional Graphics



Sunday Afternoon on La Grande Jatte, by Seurat

Computer Graphics



Computer Graphics Applications

Movies



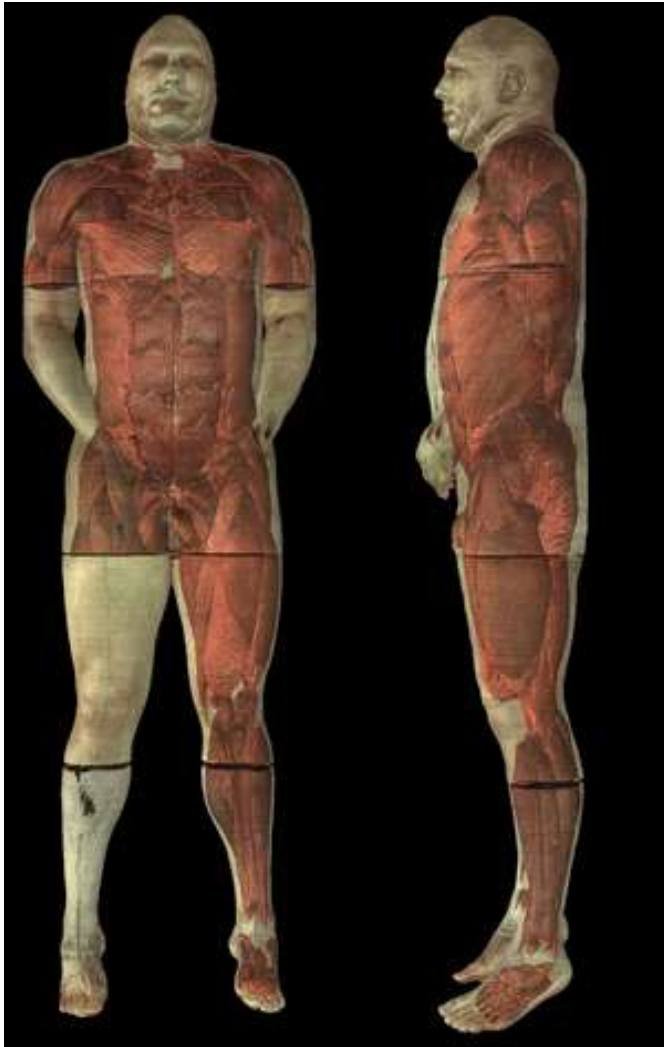
Computer Graphics Applications

Games



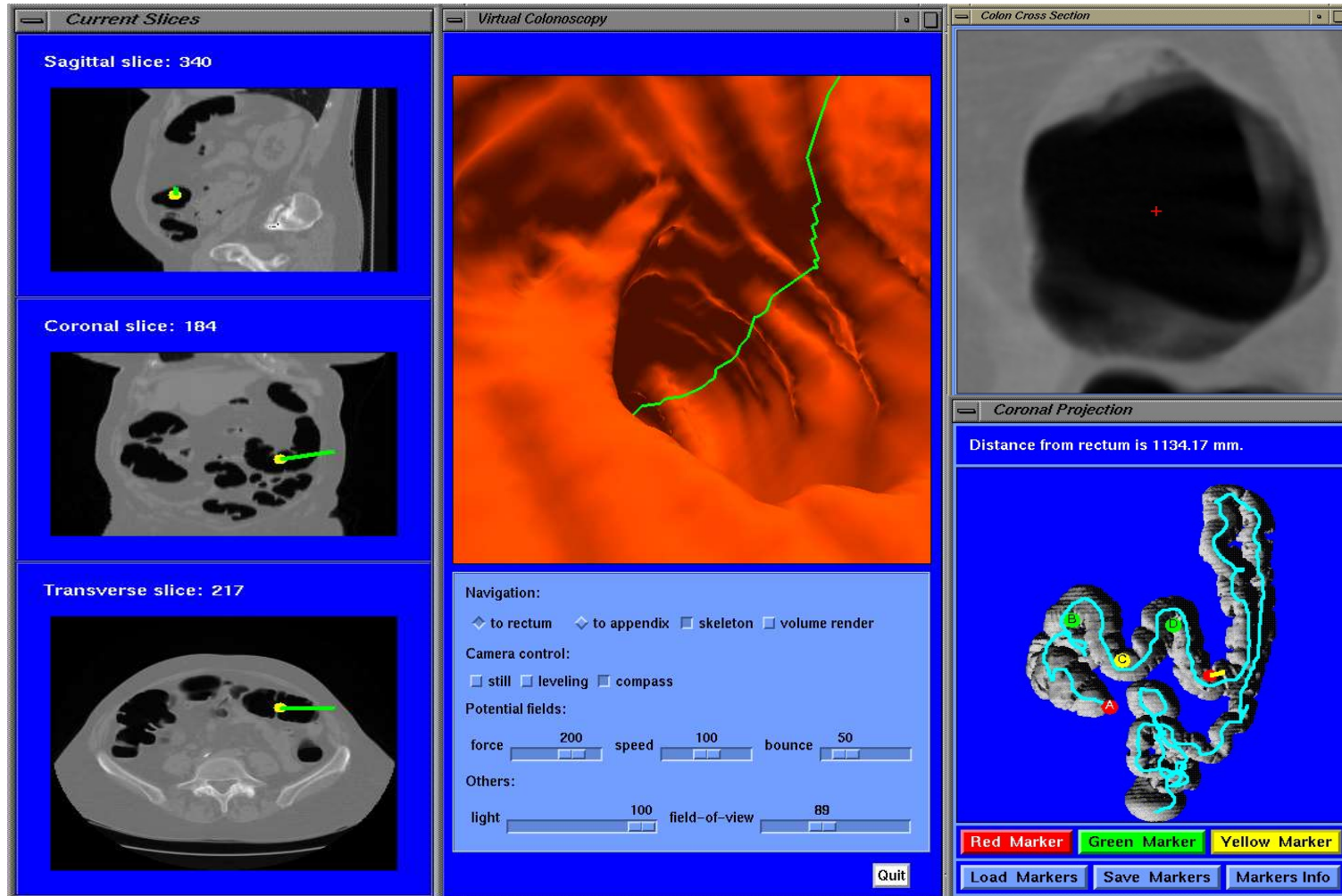
Computer Graphics Applications

Medical Visualization



Computer Graphics Applications

Medical Visualization



Computer Graphics Applications

Battlefield Visualization



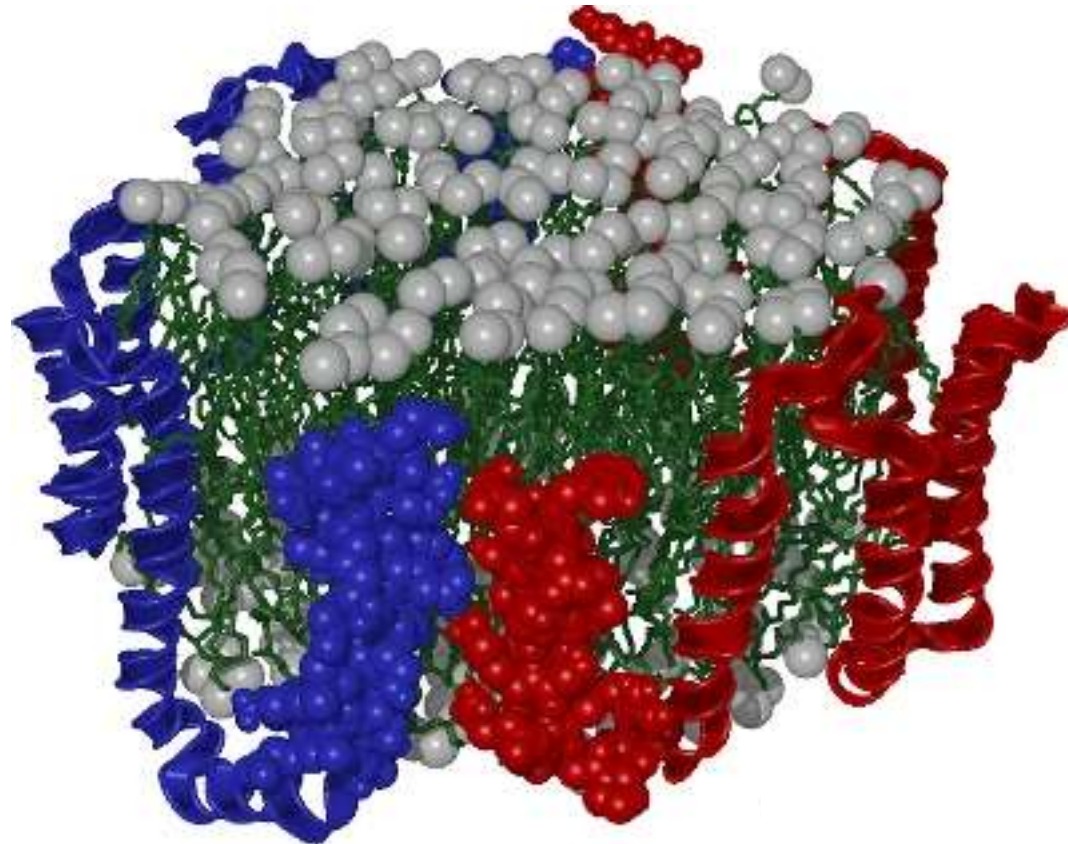
Computer Graphics Applications

Battlefield Visualization



Computer Graphics Applications

Scientific Visualization



Computer Graphics Applications

Computer Aided Design (CAD), CAM



Image generated by Marc Olano, et al.

What Is Computer Graphics About?

It is about:

- 1. realistic and/or pretty pictures.
movies, games, ...*
- 2. scientifically informative (not
necessary pretty) pictures.
scientific visualization, CAD, ...*

Three big topics ***form, behavior, appearance***

- **Modeling**: how to represent objects; how to *build* those representations.
- **Animation**: representing/controlling the way things move.
- **Rendering**: how to simulate the image-forming process.

Assignment #1

Setup a course homepage, which includes

1. something about you,
2. your view of graphics (e. g., what you think about the future of graphics?),
3. links to the rest projects (future),
4. links to computer graphics sites that you find interesting,
5. a link back to the CG course homepage.

Assignment #1

A CG Addict's Home



your portrait
(recommended)

something about you

your view of graphics

- Project #2
- Project #3
- Project #4
- Project #5

- Computer graphics sites
- SDU CG course homepage



IRC Openhouse

交叉研究中心开放日 Interdisciplinary Research Center Openhouse

交叉研究中心是山东大学计算机学院新建立的一个研究中心，中心负责人为计算机学院和软件学院院长陈宝权教授。中心有丰富的国际合作背景，现有博士、研究生和本科生共40人。目前主要研究方向为计算机图形学、计算机视觉和可视化分析与设计。中心成立将近两年时间，在图形学领域顶级会议SIGGRAPH和SIGGRAPH Asia上发表论文五篇，引起国际同行关注。

告别漫长暑假，同学们对新学期有何规划么？交叉研究中心在新学期也渴望注入新的活力。如果你想体验最新的科技产品，或者想实学充实自己，参加我们的开放日吧，欢迎充满热情的你们。

面向计算机与软件学院本科生
鼓励本科高年级同学踊跃参加
时间：9月14日 12:30
地点：学科楼一层大厅



山东大学交叉研究中心

IRC

WANTED

Find The Best Of Yourself

IRC本科科研助手选拔

时间：9月15日上午9:00,

地点：学科楼132室，交叉研究中心会议室

报名邮箱：发送报名表至OpenHouse@VisualComputing.org

报名请注明：学号，姓名，专业，一、二年级成绩排名，所获荣誉以及专业技能

报名截止至9月14日14:00

报名表下载地址：irc.cs.sdu.edu.cn

Modeling

- What to represent
 - geometry: modeling surfaces, volumes
 - photometry: light, color, reflectance
- How to *build* these representations
 - declaratively: write it down
 - programmatically: let it grow
 - interactively: sculpt it
 - via 3D sensing: scan it in

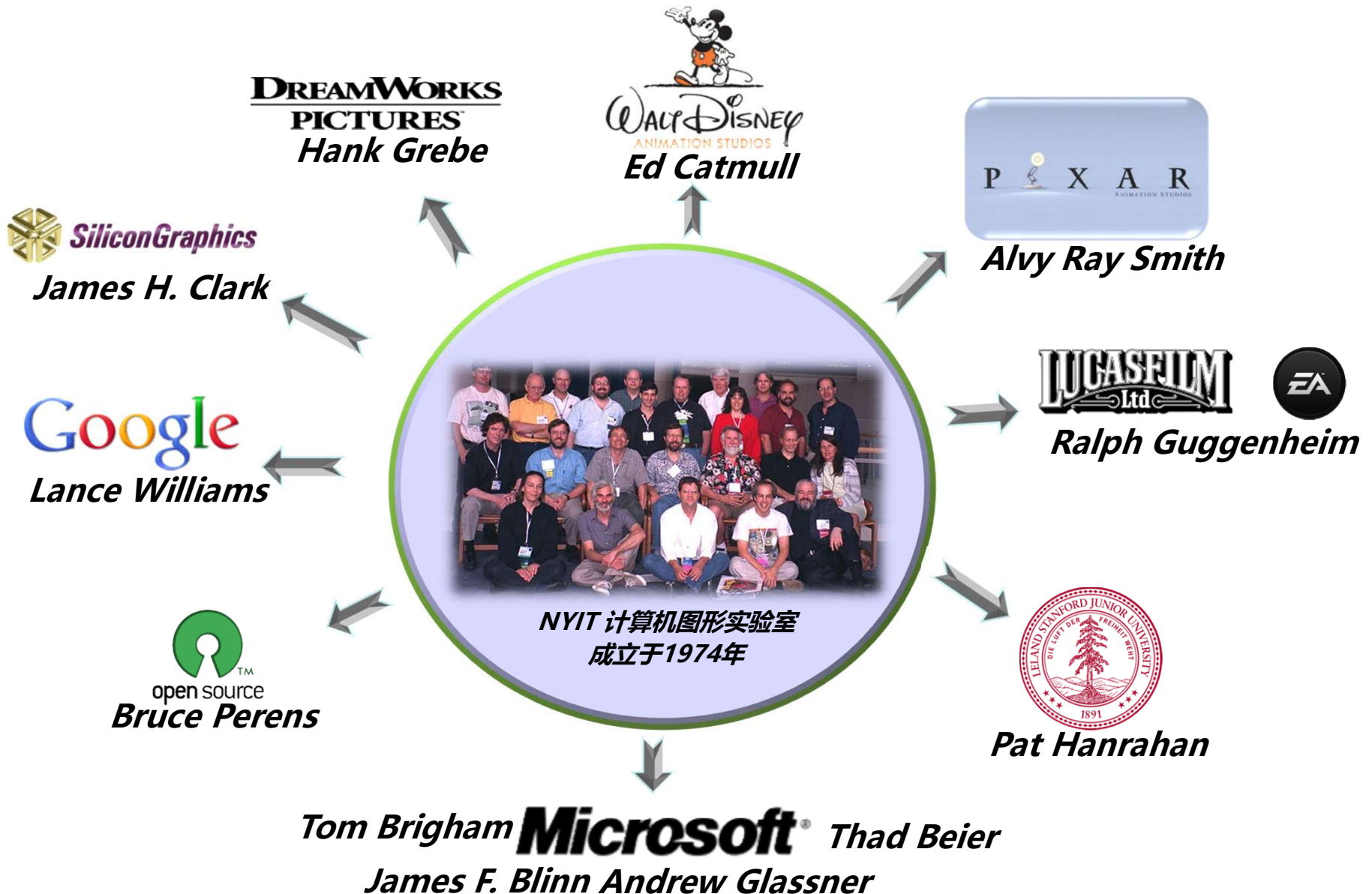
Animation

- Model how things *move*
- How to represent motion
 - sequence of stills, parameter curves
- How to specify motion
 - by hand: tweak it till it looks right
 - » key-framing, constraints
 - rule-based behaviors: artificial life
 - physics: simulate Newton's laws
 - motion capture: act it out yourself

Rendering

- What's an image?
 - distribution of light energy on 2D
“film” : $E(x, y, \lambda, t)$ (λ is wavelength.)
- How do we represent and store images
 - sampled array of “pixels” : $p[x, y]$
- How to generate images from scenes
 - input: 3D description of scene, camera
 - solve light transport through environment
 - project to camera's viewpoint
 - light transport: ray tracing, radiosity, photon-mapping, etc.

NYIT – 图形学摇篮



Hot Research Topics

- Modeling
 - model capture - getting models from the real world
 - Model analysis
 - Skin modeling
- Animation
 - motion capture
 - motion analysis
 - facial animation
- Rendering:
 - more realistic: hair, skin, etc
 - less realistic: aesthetic, informative

Go mobile!