

Winter 2013

CSE 190: 3D User Interaction

Lecture #2: Overview
Jürgen P. Schulze, Ph.D.

Announcements

- Homework Assignment #1 on-line
 - Due date: January 25 at 1pm
 - To be presented in Sequoia lab
- Reminder: paper presentations
- Final exam date: conflicts?
- Use Ted for grades and discussion boards

PRIME

For more information on PRIME, please visit: <http://prime.ucsd.edu>

PRIME 2013

Information Session — January 10, 2013 @ 6pm
UCSD International Center Lounge

Pacific Rim Experiences for
Undergraduates:
An International Research Internship



PRIME is an **international research internship** and **cultural experience** that prepares students for the global workplace in the 21st century.

- Students have two mentors, a researcher at UCSD and another one at the international internship host site.
- Students do research at advanced institutions on the Pacific Rim countries, including Australia, China, Japan, Taiwan and more!
- Basic expenses are covered by grant funds.

At the information session you will hear from the program directors about the program and application process, from UCSD mentors about the opportunities, and from former PRIME students about the experience from their perspective.

Please Join Us!

Hear from PRIME Alumni!

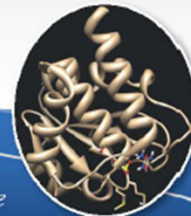
Find out how you can apply for this exciting opportunity!

Gain research experience abroad and contribute to the international scientific community!



"PRIME gave me a hands-on perspective as to how research can be fun in an international context."

Harriet Hu, 2012 PRIME
Australia Alumna



"Without question, PRIME was the most influential experience I had during my time as an undergraduate at UCSD. The foundation of knowledge in high performance computing that I acquired through PRIME is something that I have continued to use every day in my research career."
John Colby (UCLA: MD/PhD), 2004 UCSD PRIME Australia Alumnus

Homework Assignment 1

- Assignment review
- Q&A

Interaction Goals

- Performance
 - efficiency
 - accuracy
 - productivity
- Usability
 - ease of use
 - ease of learning
 - user comfort
- Usefulness
 - interaction helps meet system goals
 - interface relatively transparent so users can focus on tasks

Universal 3D Interaction Tasks

- Navigation
 - travel: motor component
 - wayfinding: cognitive component
- Selection/Picking
- Manipulation
 - specification of object position & orientation
 - specification of scale, shape, other attributes
- System Control
 - changing the system state or interaction mode
 - may be composed of other tasks
- Symbolic Input (text, numbers)

3D UI Design Philosophies

- Artistic approach: Base design decisions on
 - intuition about users, tasks, and environments
 - heuristics, metaphors, common Sense
 - aesthetics
 - adaptation/inversion of existing interfaces
- Scientific approach: Base design decisions on
 - formal characterization of users, tasks, and environments
 - quantitative evaluation results
 - performance requirements
 - examples: taxonomies, formal experimentation

Applications

- Architecture / CAD
- Education
- Manufacturing
- Medicine
- Simulation / Training
- Entertainment – *Games!*
- Design / Prototyping
- Information / Scientific Visualization
- Collaboration / Communication

3D UI RoadMap

Areas influencing 3D UIs

Theoretical and social background

- Human spatial perception, cognition, and action
- HCI and UI Design
- Popular Media

Technological background

- Interactive 3D graphics
- 3D visualization
- 3D input devices
- 3D display devices
- Simulator systems
- Teleresence systems
- Virtual reality systems

3D UIs

3D interaction techniques and interface components

- Interaction techniques for universal tasks
- Interaction techniques for complex or composite tasks
- 3D interaction techniques using 2D devices
- 3D UI widgets

3D UI evaluation

- Evaluation of devices
- Evaluation of interaction techniques
- Evaluation of complete 3D UIs or applications
- Specialized evaluation approaches
- Studies of phenomena particular to 3D UIs

3D UI design approaches

- Hybrid interaction techniques
- Two-handed interaction
- Multimodal interaction
- 3D interaction aids
- 3D UI design strategies

3D UI software tools

- Development tools for 3D applications
- Specialized development tools for 3D interfaces
- 3D modeling tools

Areas impacted by 3D UIs

Application areas

- Simulation and training
- Education
- Entertainment
- Art
- Visualization
- Architecture and construction
- Medicine and psychiatry
- Collaboration

Standards

- For interactive 3D graphics
- For UI description

Reciprocal impacts

- On graphics
- On HCI
- On psychology

Interaction Workflow

