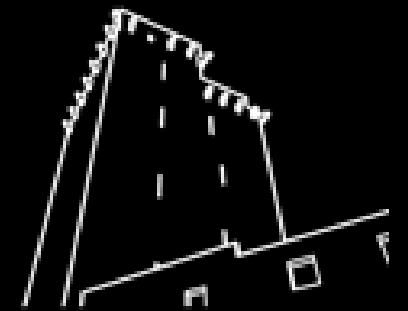




Eurographics 2012

Cagliari, Italy

May 13-18



33rd ANNUAL CONFERENCE OF THE EUROPEAN ASSOCIATION FOR COMPUTER GRAPHICS



Dynamic Geometry Processing

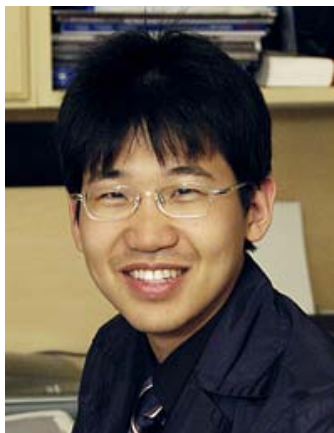
EG 2012 Tutorial

Will Chang, Hao Li, Niloy Mitra,
Mark Pauly, Michael Wand

Overview

Speakers & Topics

Presenters



Will Chang

University of California
at San Diego, USA

wychang@cs.ucsd.edu



Hao Li

Columbia University,
USA

hao@inf.ethz.ch



Niloy Mitra

University Colledge
London, UK

n.mitra@cs.ucl.ac.uk



Mark Pauly

EPFL Lausanne
Switzerland

mark.pauly@epfl.ch



Michael Wand

Saarland University,
MPI Informatik, Germany

mwand@mpi-inf.mpg.de

Course Webpage

Course Webpage

- Updated slides
- Literature & references
- Additional material / data sets

Linked from:

- <http://www.mpi-inf.mpg.de/~mwand/>
- Available next week

What we cover

Basics

- Motivation, data sources, problems
- Basic correspondence estimation techniques

Dynamic Geometry Registration

- Kinematic surfaces and geometric optical flow
- Incremental deformable matching
- Deformation graphs

Bringing it all together: State-of-the-art systems

- Example 1: *offline* tracking system for articulated models
- Example 2: *real-time* face tracking (“faceshift”)

Data Sources

Where does all the data come from?

Deformable Shape Matching

New technology

- 3D animation scanners
- Record 3D video
- Active research area

Ultimate goal

- 3D movie making
- New creative perspectives



[P. Jenke, WSI/GRIS Tübingen]

Time-of-Flight / PMD Devices



PMD Time-of-flight camera



Minolta Laser Scanner (static)

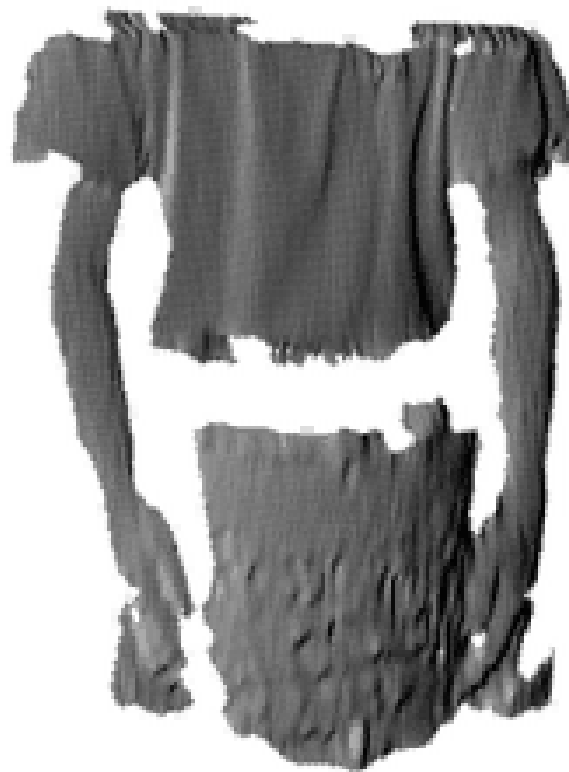


Structured / Unstructured Light Scanners



**space-time
stereo**

courtesy of James Davis,
UC Santa Cruz



**color-coded
structured light**

courtesy of Phil Fong,
Stanford University



**motion compensated
structured light**

courtesy of Sören König,
TU Dresden

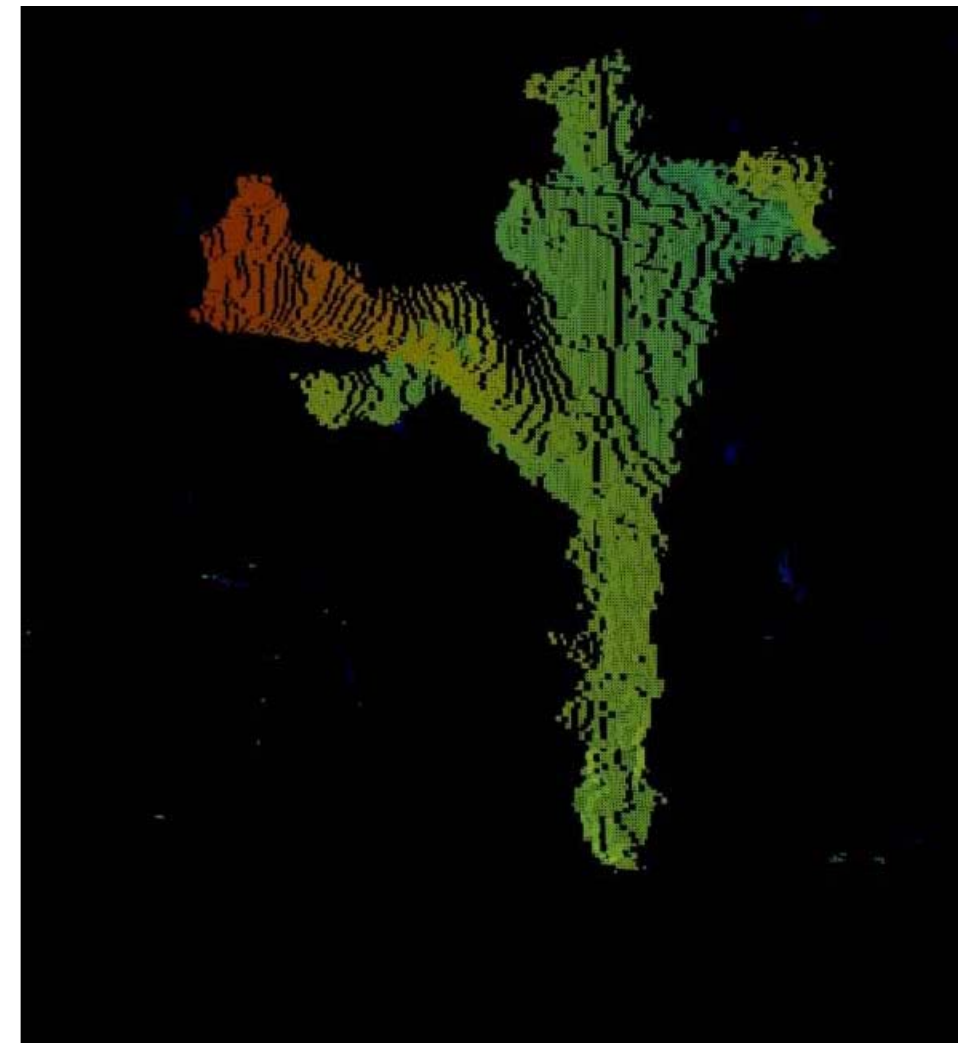
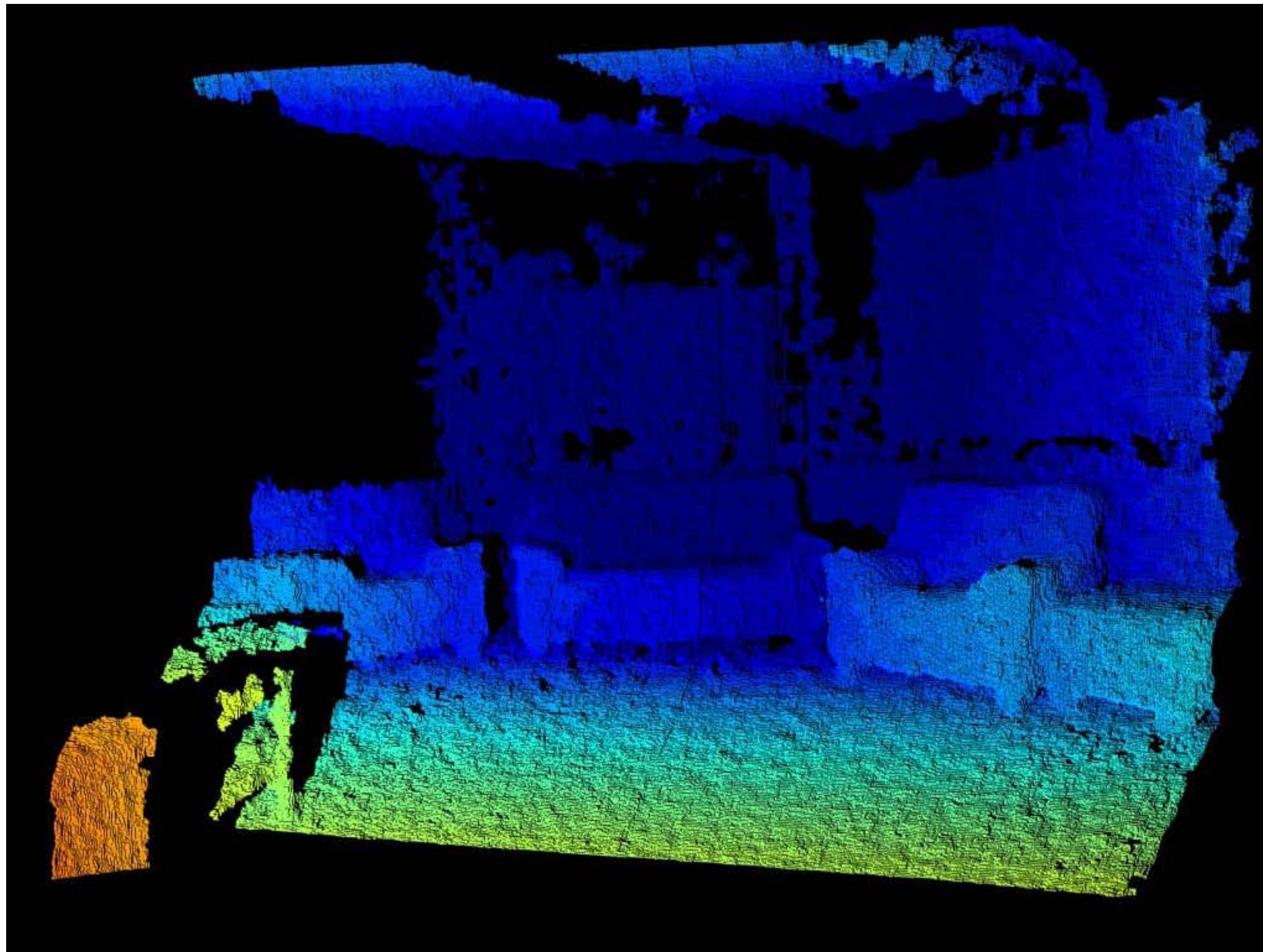
Going Mainstream



KINECT™
for  XBOX 360.

[Microsoft 2010]

Kinect Example Data



High-End Acquisition Setup: Lightstage



[Vlasic et al., Siggraph Asia 2009]

Lightstage Example Sequence



[Vlasic et al., Siggraph Asia 2009]

Problems & Topics

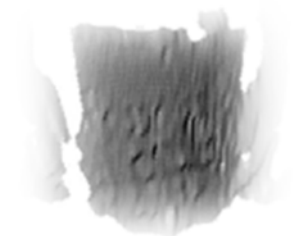
Processing Dynamic Geometry

Problems

- Noise, outliers
- Missing data
- No correspondences
- No semantics (joints, bones, expressions)

We discuss

- Establishing correspondences
- Reconstruction
 - Noise removal
 - Hole filling
- Data-driven priors
- Semantic rigging



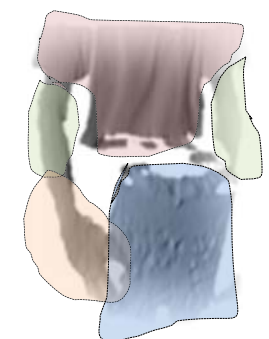
noise



holes



missing correspondences



missing semantics