

# Computational Photography Lab Course

Image Stitching Warm Up: **Little Planets**

# Creating Little Planets

- Pick a suitable scene:
    - Urban scene vs nature, moving objects, proximity of objects
  - Take the images
    - Tripod
    - Number of images
    - Focal length
    - Focus
    - Exposition time
  - Create a panorama / stitch the images (Hugin/Autostitch/ICE)
  - Create planet: warp the panorama
    - Transforming to Polar Coordinates (GIMP/Photoshop)
    - Stereographic projection (Hugin)
  - Postprocessing: stamp or die (GIMP/paint.net)
- the hard bit
- easy

# **Examples**

## **Steps and Lessons Learned**

# Example: Making of Garching

After selection and downsampling of images: 378 images, ~1GB



## Example: Making of Garching: The Raw Stitch



generated with the Image Composite Editor - ICE (Microsoft Research)

## Example: Making of Garching: Stereographic Projection



generated with hugin

## Example: Making of Garching: Postprocessing



postprocessed with  
GIMP

# Example: Yet Another Polar Planet



# Example: Yet Another Polar Planet



# Example: Yet Another Polar Planet



## Example: Yet Another Polar Planet



## Example: Yet Another Polar Planet



## Example: Yet Another Polar Planet



## Example: Yet Another Polar Planet



## Example: Yet Another Polar Planet





# Assignment

(due Tuesday, 12 May, 23:59)

- Create a set of own images for a 180x360° panorama (4pts)
- Create a panorama with:
  1. Hugin (1pt)
  2. Autostitch (1pt)
  3. ICE (1pt)
- Create a planet from one of the panoramas (1/2/3) by:
  - a) Polar coordinate transformation (1pt)
  - b) Stereographic projection (1pt)
- Perform post-processing on one of the results (a/b) by software of your choice (1pt)  
(extra points possible depending on quality of results)
- Deliverable: HTML page (as ZIP) including:
  - Input images
  - Intermediate results 1, 2, 3, and a, b
  - Final planet image
  - Brief description of the single steps

# Software

- **The GIMP:**
  - <http://www.gimp.org/>
- **paint.net:**
  - <http://www.getpaint.net/>
- **Autostitch (University of British Columbia):**
  - <http://www.cs.ubc.ca/~mbrown/autostitch/autostitch.html>
- **hugin - Panorama photo stitcher:**
  - <http://hugin.sourceforge.net/>
- **Image Composite Editor (Microsoft Research):**
  - <http://research.microsoft.com/en-us/um/redmond/groups/ivm/ICE/>

## Some other related nice stuff:

- **Take Look at HDView option of ICE:**
  - <http://research.microsoft.com/en-us/um/redmond/groups/ivm/HDView/>
- **Microsoft PhotoSynth:**
  - <http://livelabs.com/photosynth/>

# Tutorials

- How to create a little planet using Hugin
  - <http://ultrawide.wordpress.com/2008/11/20/how-to-create-a-little-planet-using-hugin/>
- Creating a 360 Panorama / Creating a Small Planet
  - <http://tjhole.com/tutorials/?p=7>
  - <http://tjhole.com/tutorials/?p=8>
- Some Ideas:
  - <http://fiveprime.org/hivemind/Tags/hugin>
  - <http://www.flickr.com/photos/joshsommers/sets/72157600265551673/>
  - <http://www.flickr.com/groups/createyourownplanets/pool/>

# Image Stitching Outline

- Detect distinct features in images
- Find correspondences between the features in the single images
- Use the features to compute transformations which align the images
- Align the images into one image
- Additional: Blend the images nicely
  
- next class:
  - ginput the correspondences
  - do the DLT
  - generate final image: do the warping
  
- the übernext class:
  - Harris corner feature extraction
  - Finding corresponding features: correlation + ransac