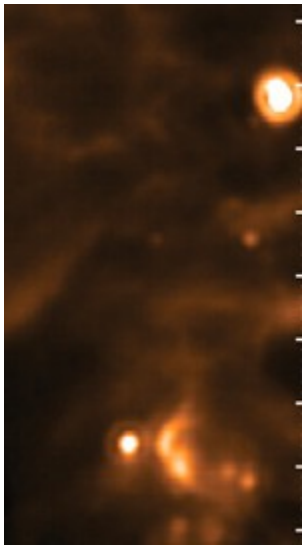
‘Visual’ and ‘Metric’ 3D

How to process reference images
and display resolution
to pave way
for reliable automation

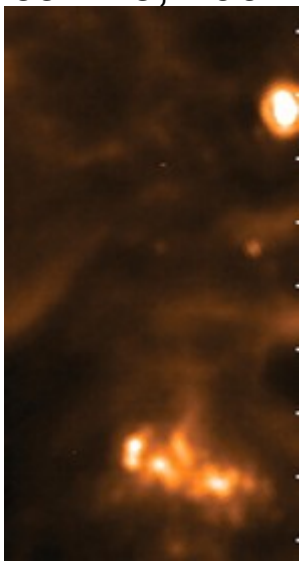
Sabine K McNeill – Nov. 12, 2008

Infrared images taken at different times reveal the birth of supernova Cassiopeia. The transition between images can now be newly investigated.

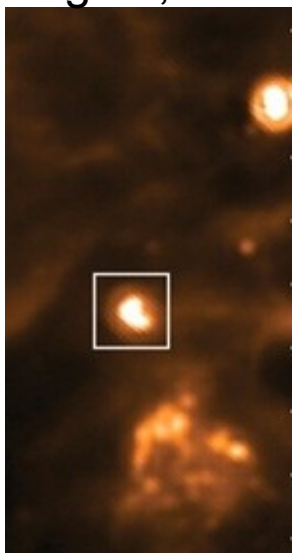
Oct 2, 2006



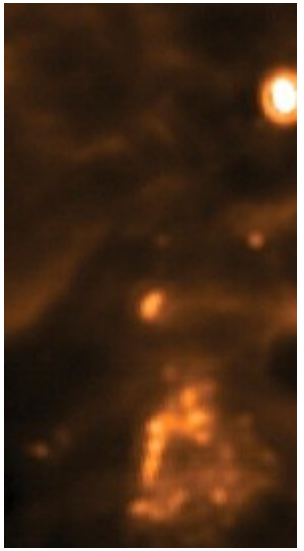
Jan 23, 2007

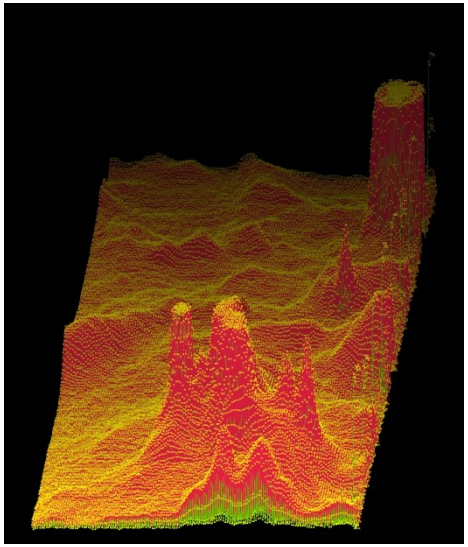


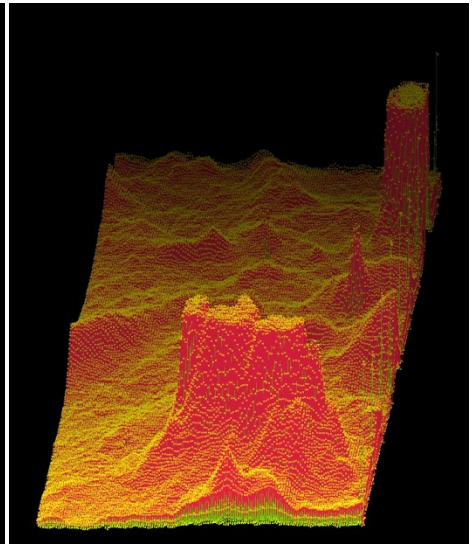
Aug 28, 2007

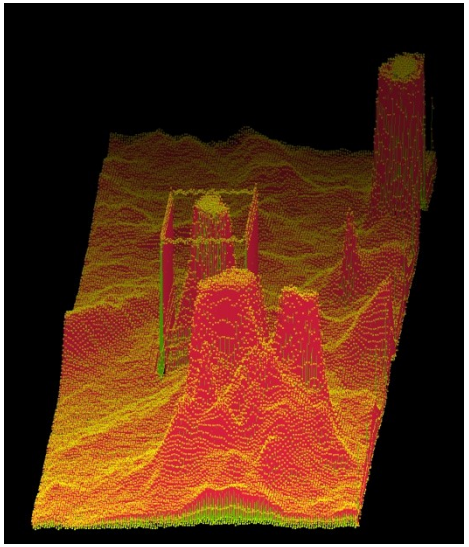


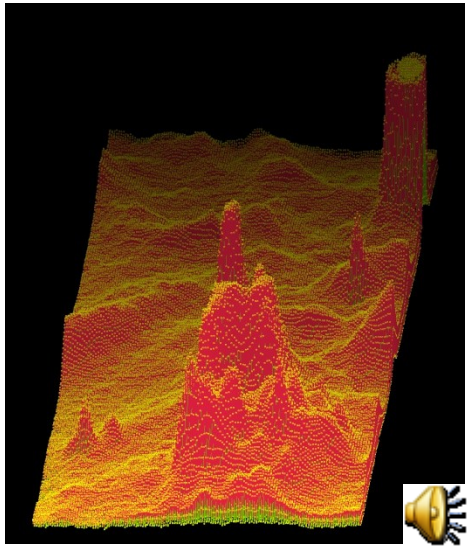
Jan 8, 2008



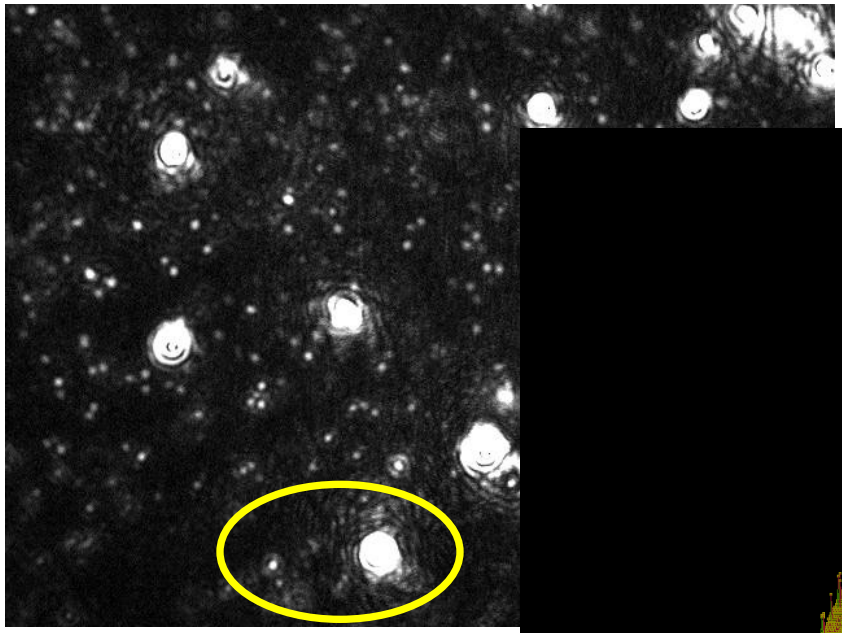


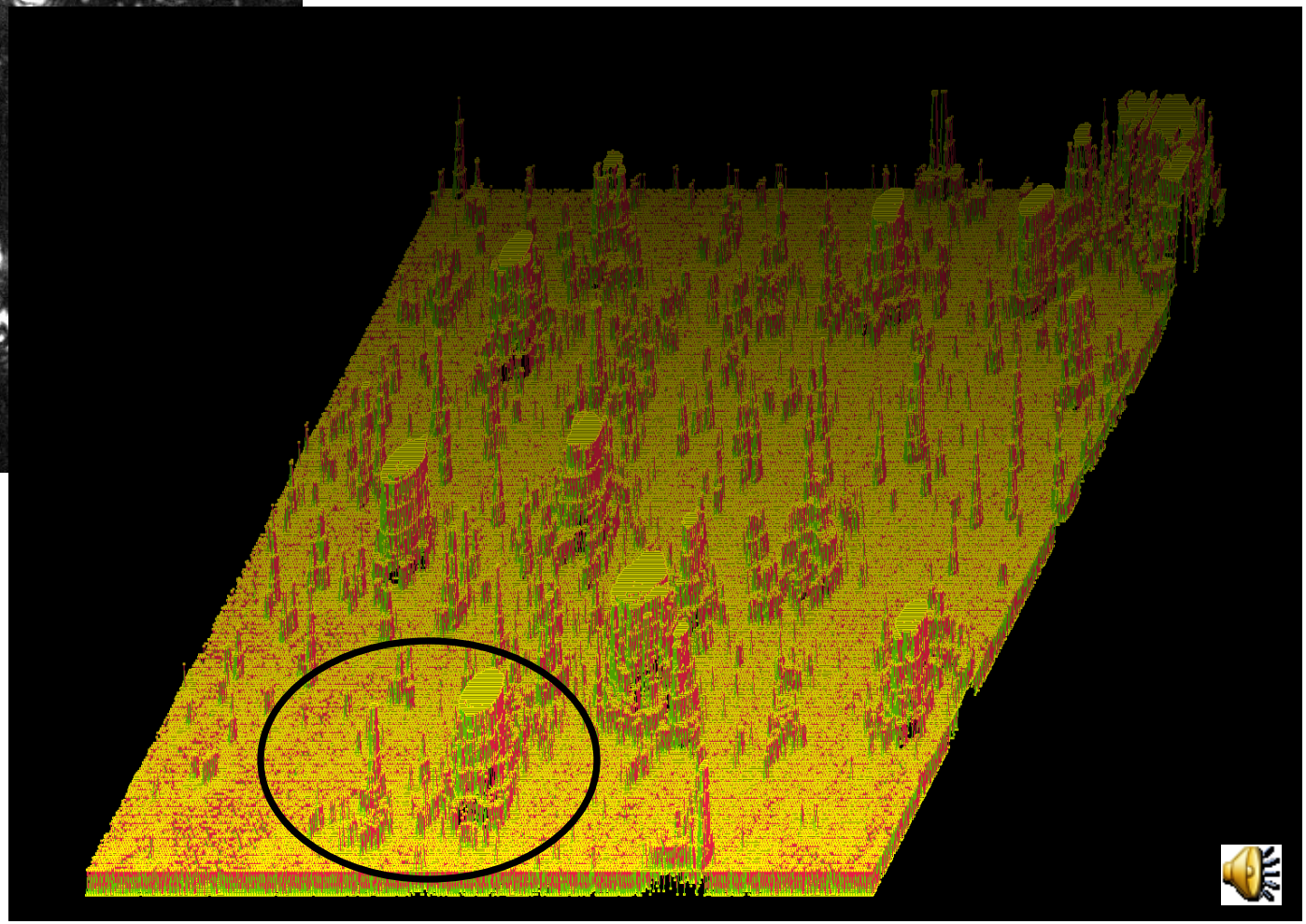




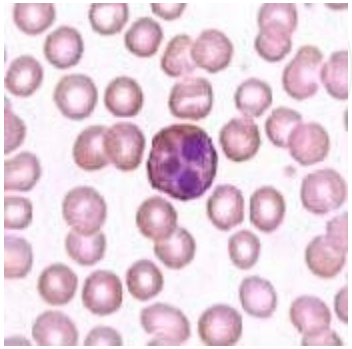


Re-visualized NanoVideo



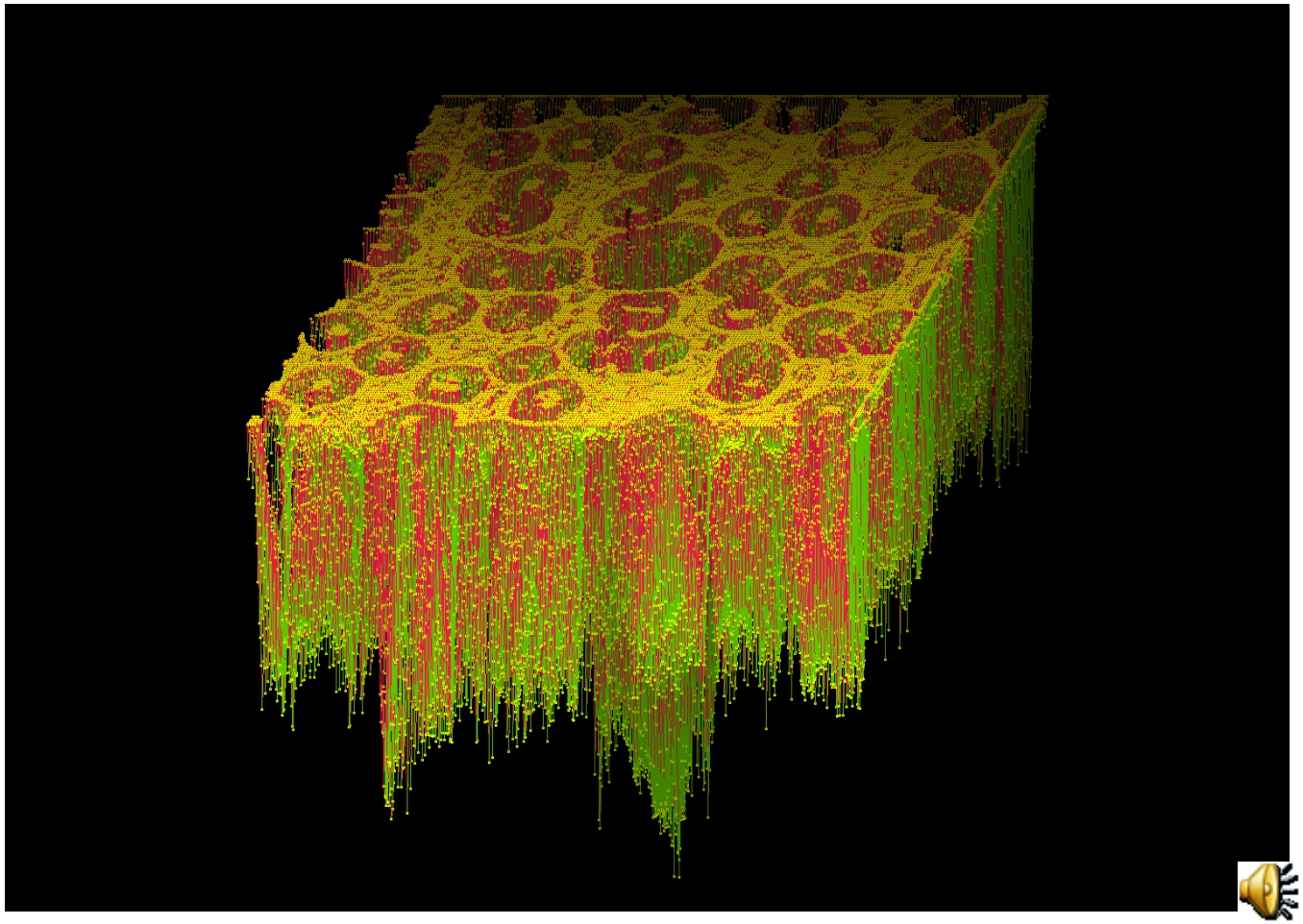


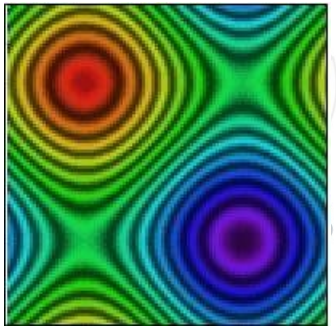
The screenshot shows Brownian motion of a video frame recorded by Nanosight.



Red & white Blood Cells

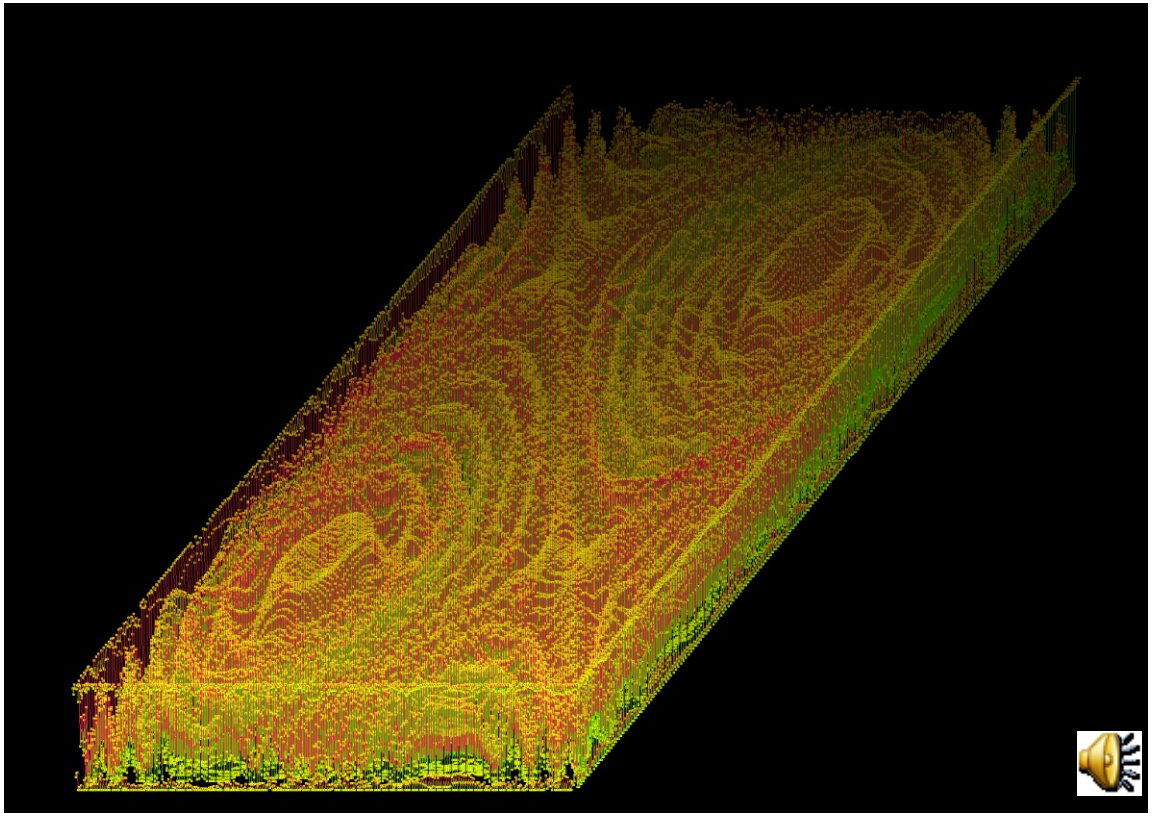
The re-visualization of microscopic images will allow for scanning hundreds and thousands of images for particular indicators.

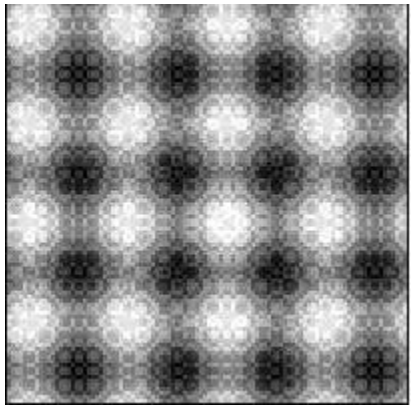




Reference Colours

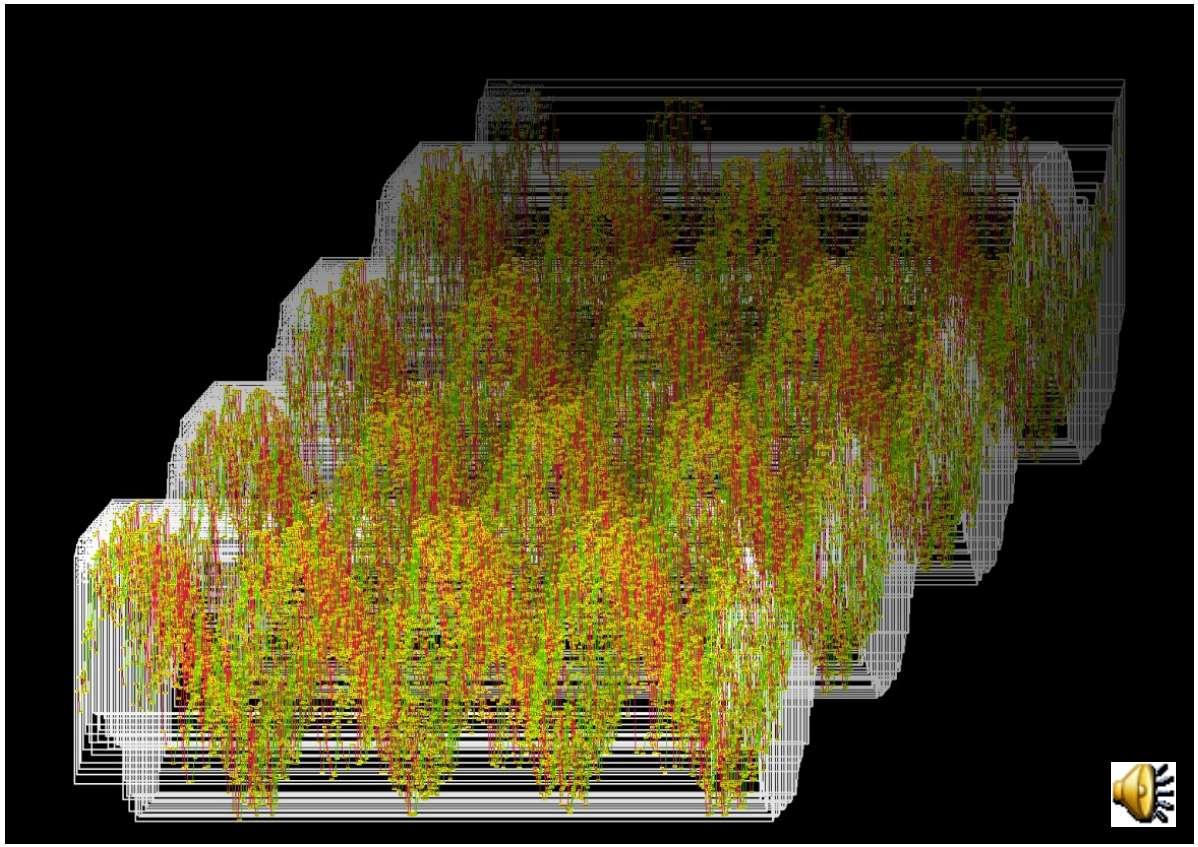
- Calibrating Displays means using Reference Images to test
  - Resolution
  - Colour representation
  - Suitability for particular visualizations





Reference Resolutions

- Resolutions for
  - Calibrating single instruments
  - Comparing different instruments



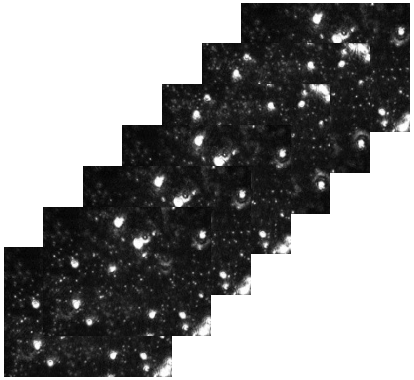
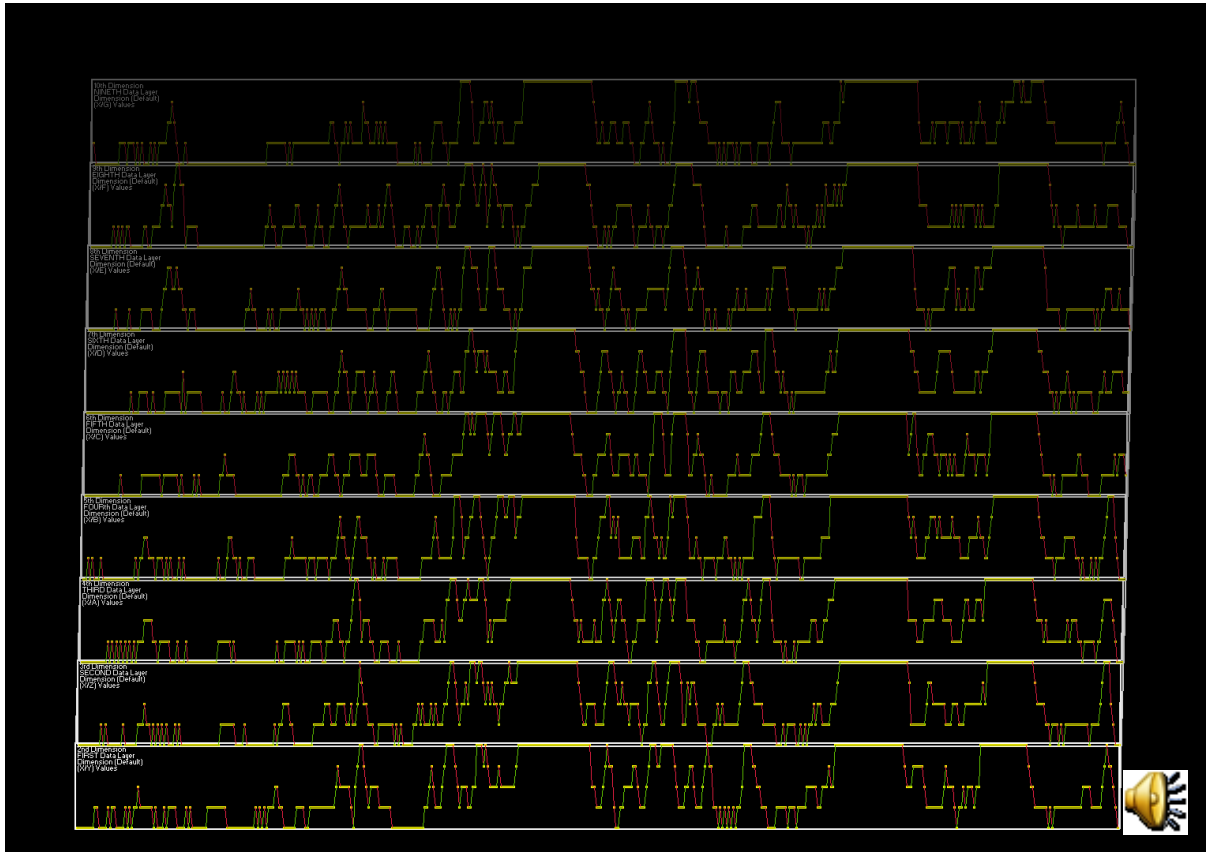
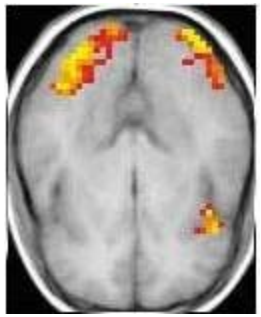


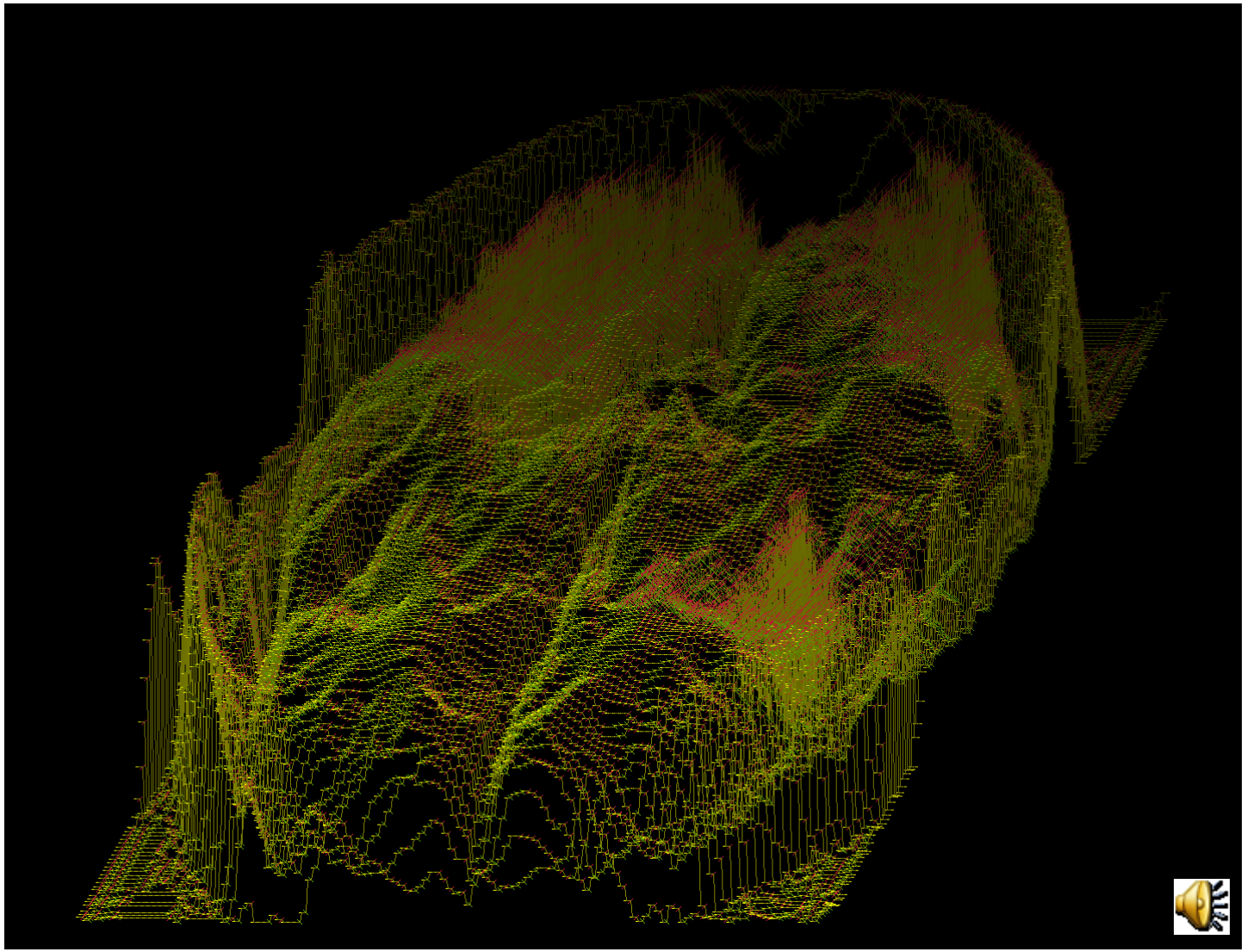
Image Collections

- References
  - Change
  - Progress
  - First of a series
- Quantitative comparisons

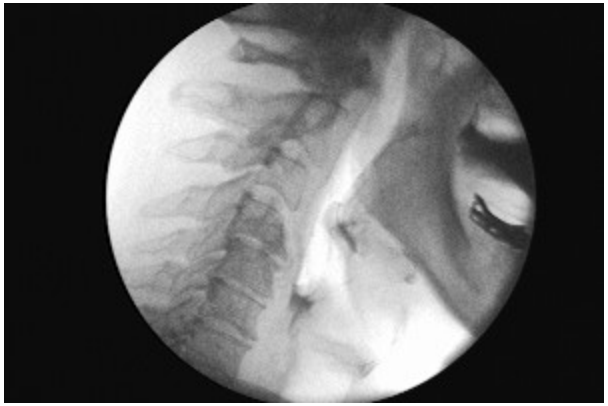




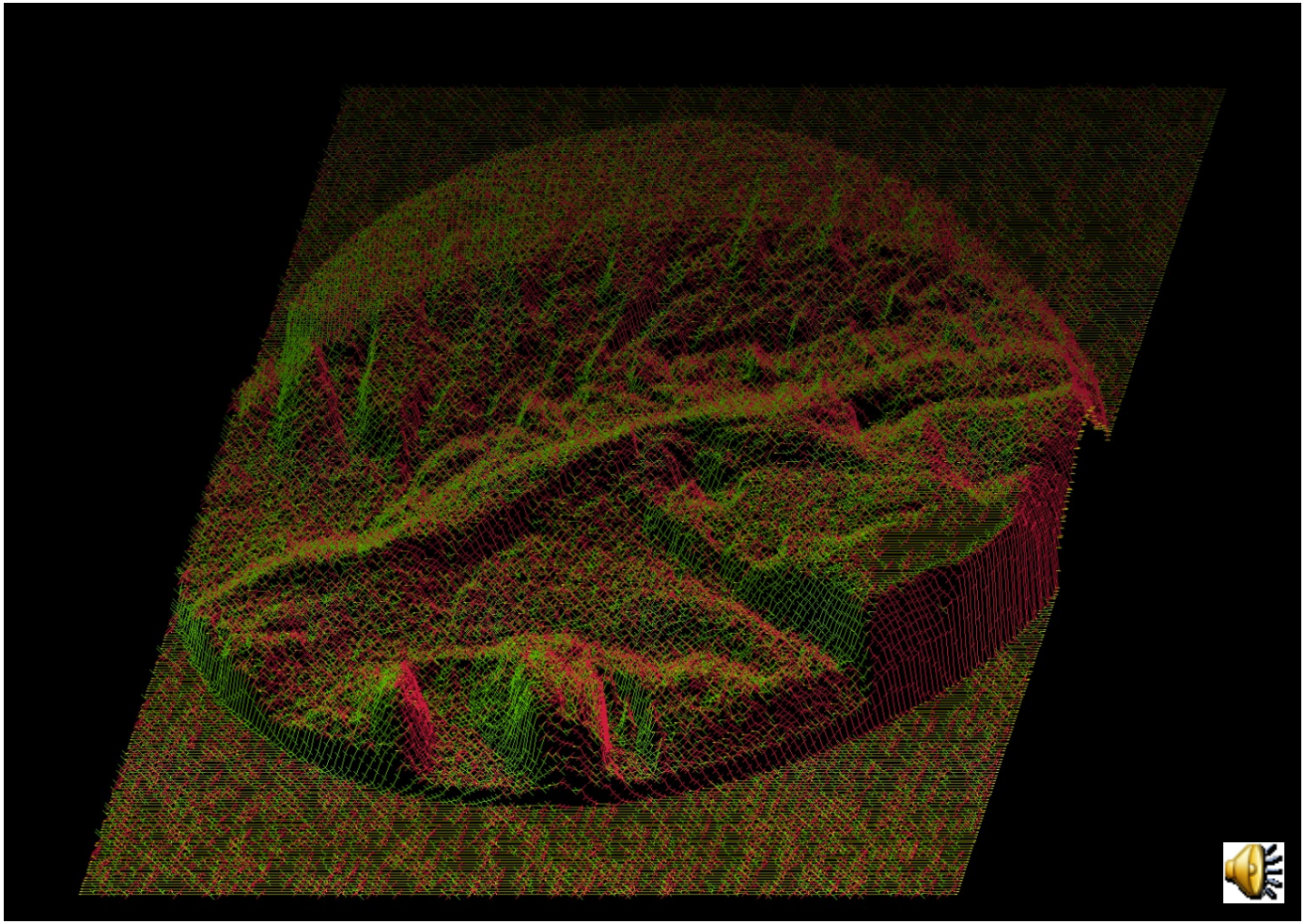
Different Instruments



This functional MRI scan was published by the Health Sciences Initiative of the University of Berkeley.
See http://tinyurl.com/54wuk2



Fluoro X-ray

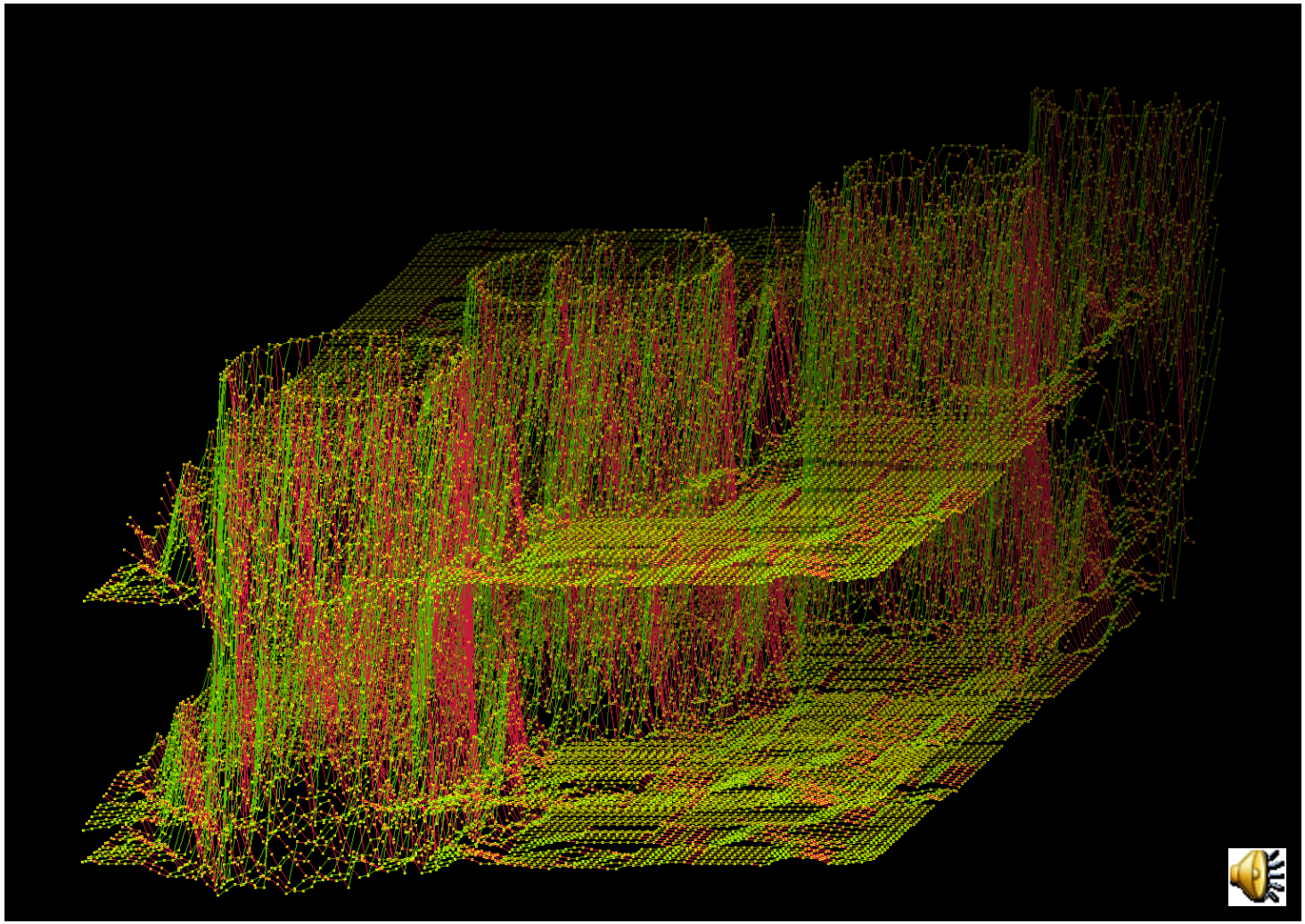


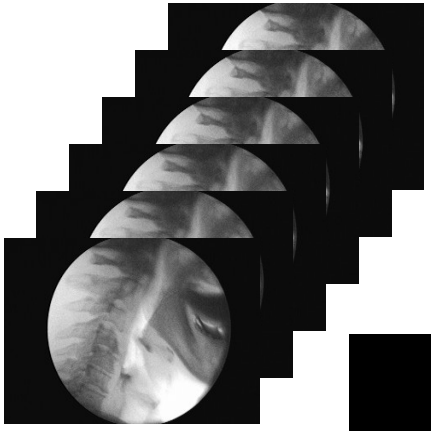
A patient swallowing.

The screenshot shows new visual depth and new metric details plus texture through colour.

Stem cells

Seeing cells in more detail allows for new investigations of the influences of drugs for example.

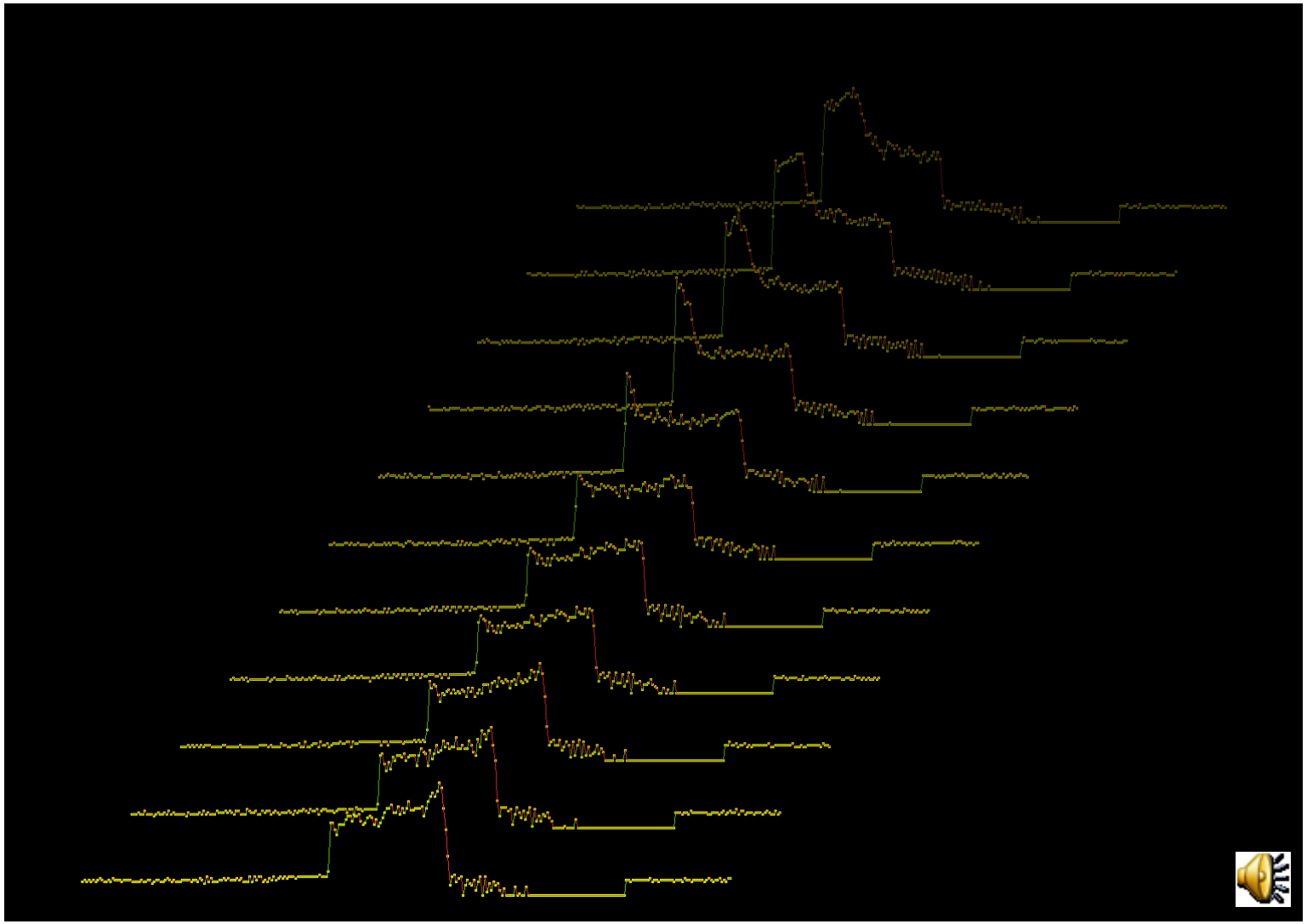




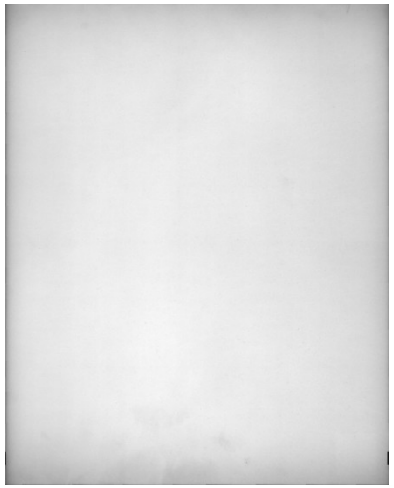
Comparing Images

Eleven ‘metric profiles’ for eleven larynx images.

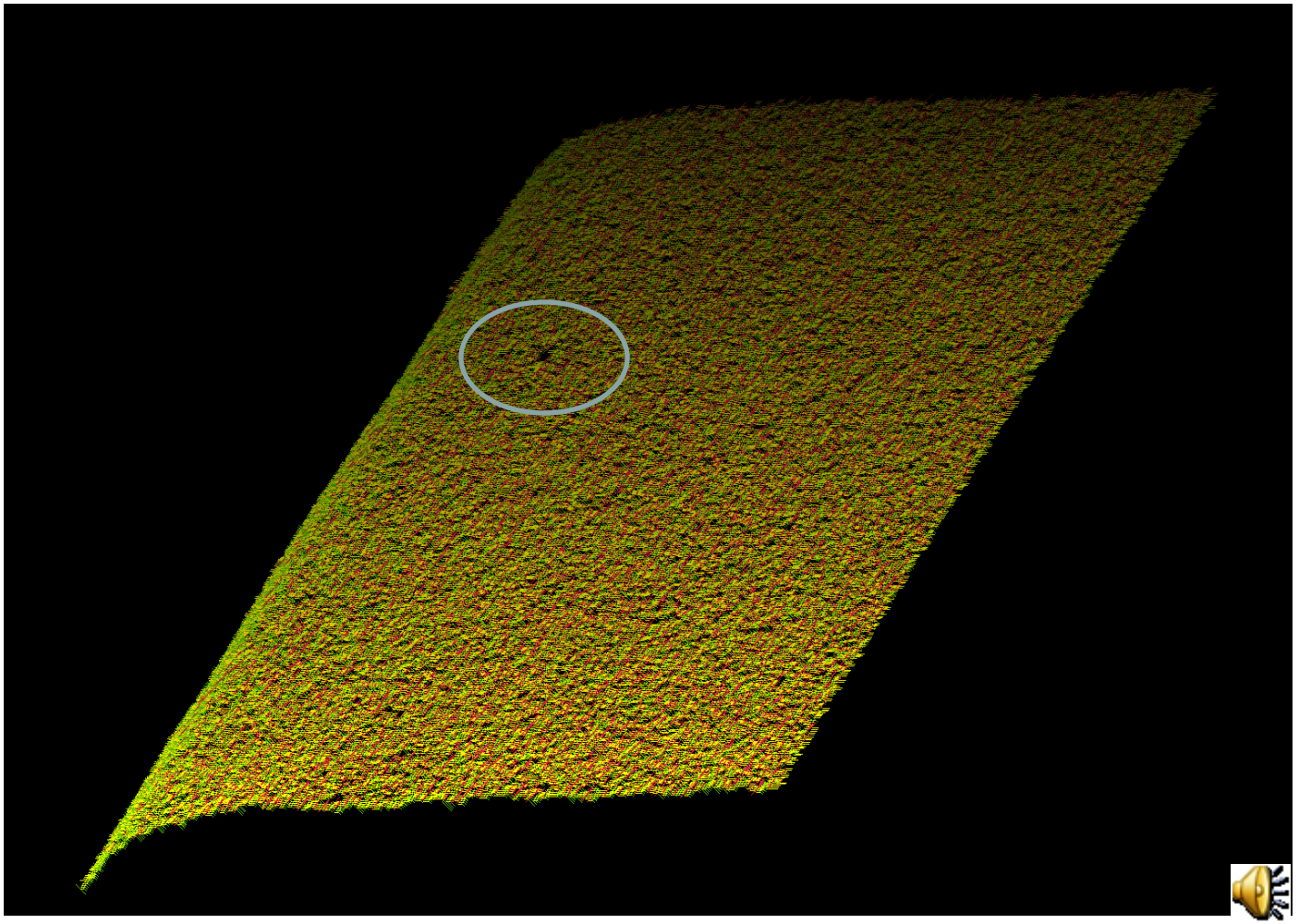
Visually compared and metrically evaluated for sorting, classifying and ranking.



Display Resolution



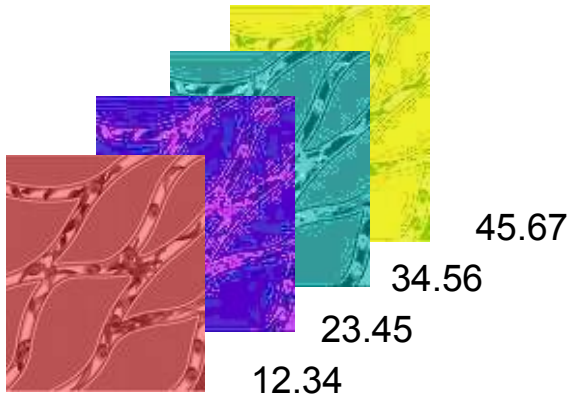
2048 x 2560 pixels



400 x 400 pixels

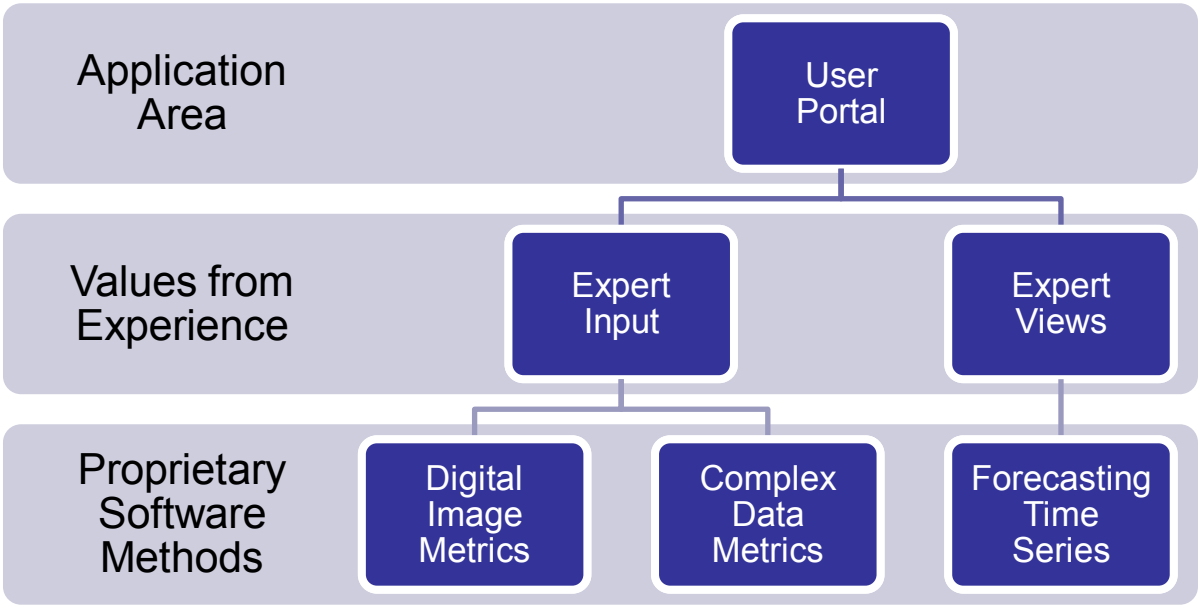
Reliable Automation

- Image Data Metrics
  - Quantifying images as a whole
    - Classifying
    - Sorting / Ranking
    - Selecting against Decision Making Criteria



A new Expert System

- Expert views for expert input
  - Limits
  - Standards
  - Reference values



Layers of Software

KNOWLEDGE

User and Domain dependent
Menu Options

Context Dependent Visualization

INFORMATION

User and Domain dependent
Vocabularies

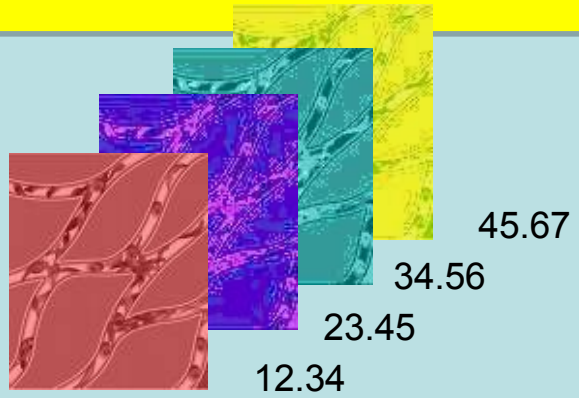


Image Collections
Data Bases

DATA

Visualizing
Layers
as Proof of Concept

Core Processes

Integrating Expertise

3D-Mintegration

- Lamination methods
- Modular joining 3D blocks
- Folding technique
  - Health and usage monitoring sensor
  - Minifluidic device for chemical/biological processing
  - 3D electro-mechanical system.

3D Metrics

- **Data**
  - Sensor input
  - Real time series
- **Images**
  - Instrument calibration
  - High throughput automation

New Instrument of Investigation

- “Humboldt had a horror of the single fact, believing that in order to explore any one thing, one needs to approach it from all sides... Every discovery opens up the imagination further, stimulating more discovery: it enlarges the sphere of ideas, excites a taste for investigation, while the creation of new instruments of observation increases the intelligence.”

  Theodore Zeldin, *An Intimate History of Humanity*, London 1994

- Measuring ‘on screen’
  - Time series at any interval
  - Measurements from any application
  - Digital images from any technology.

Thank You!

- More on
  - http://3dmetrics.co.uk
  - http://3dmetrics.wordpress.com

- Or by email from
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  - T: 020 7328 3701
  - M: 07968 039 141