



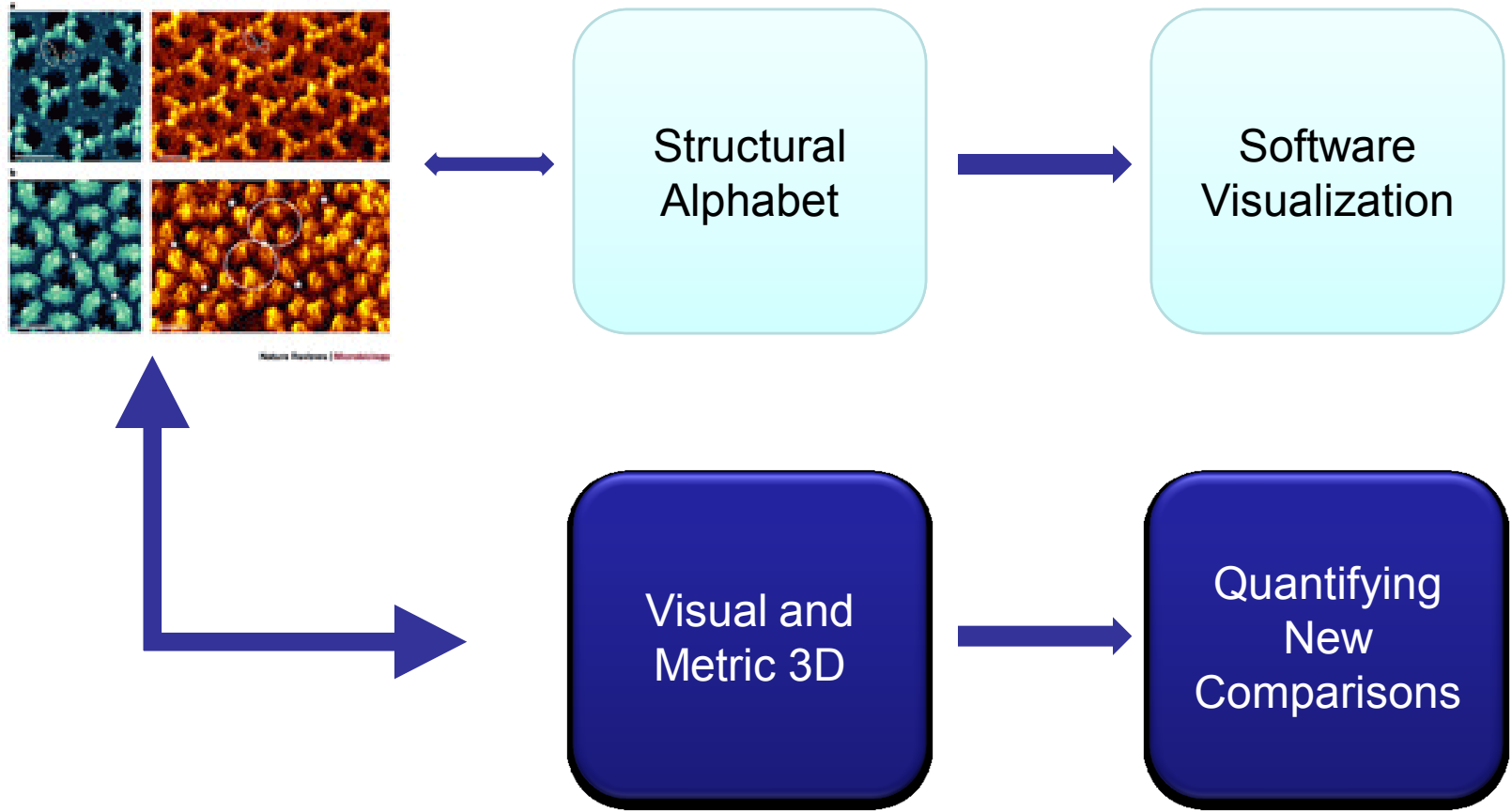
# “Visual” and “Metric 3D”

New Digital Image Metrics  
for Deepening Protein Analysis

**Sabine K McNeill – Dec. 10, 2008**



# Looking at Proteins



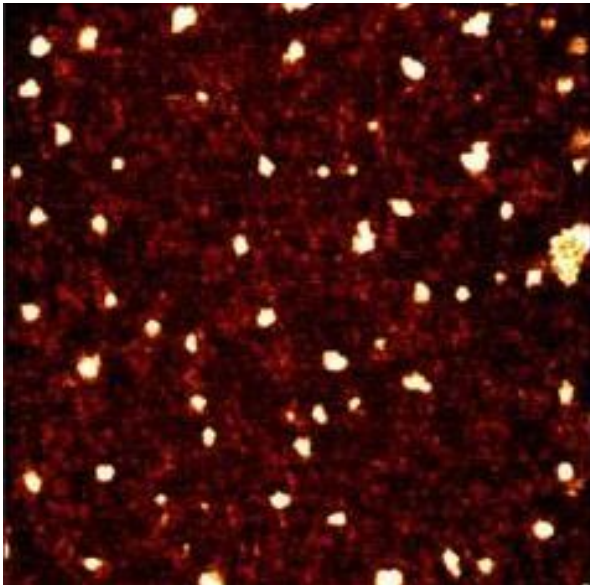


# Software Vision

## Microscopic Images

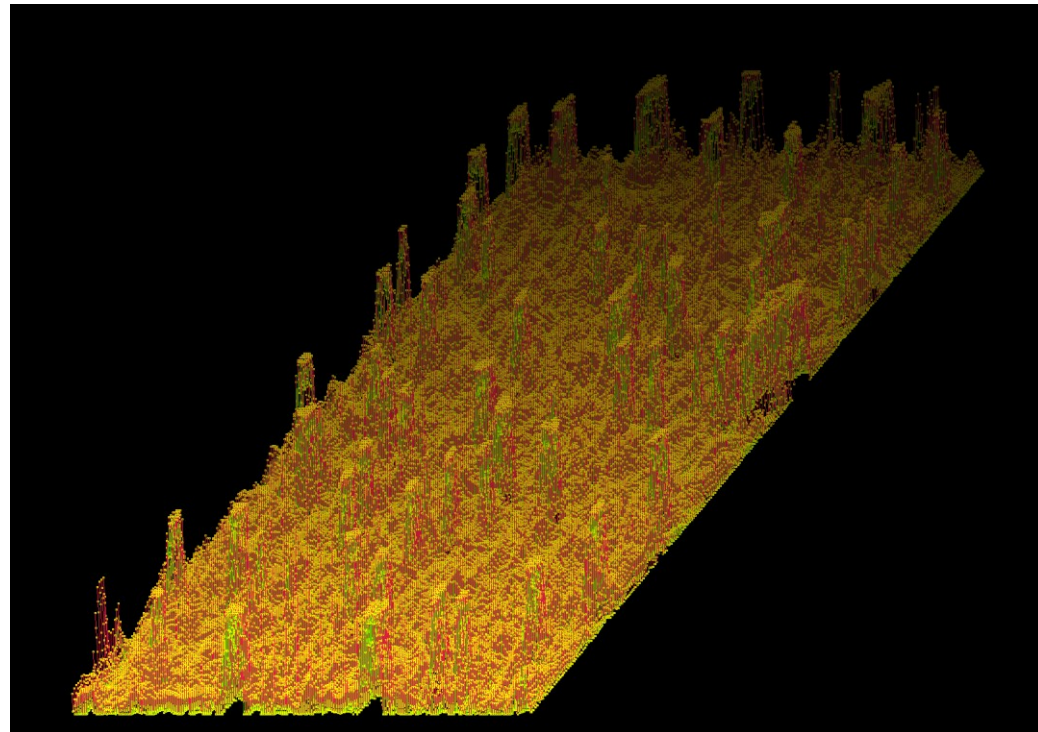
- Light & glass lenses
- Electrostatic & electromagnetic lenses

Cytochrome-C protein - JPK



## 3d Metric Re-visualization

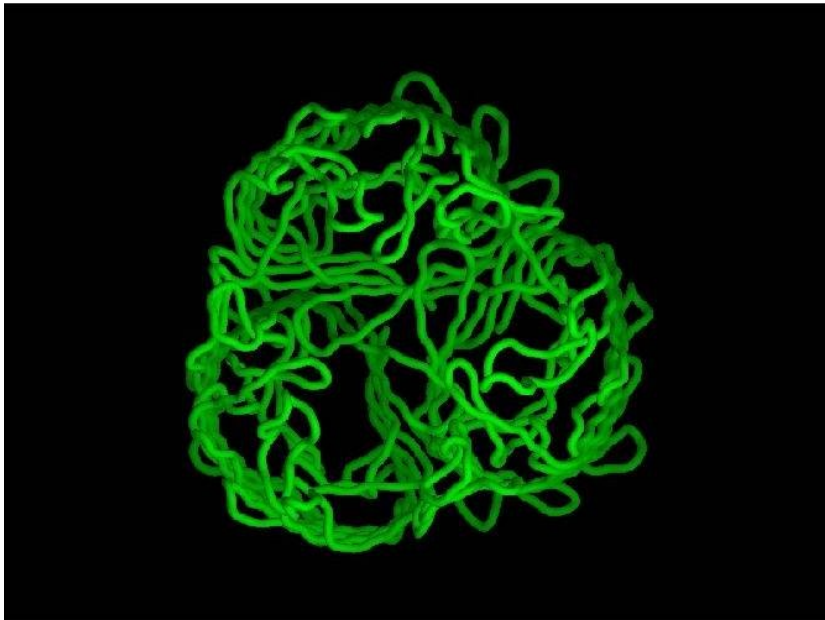
- Visual depth & perspective
- Quantifications of comparisons



# Visualizing Proteins

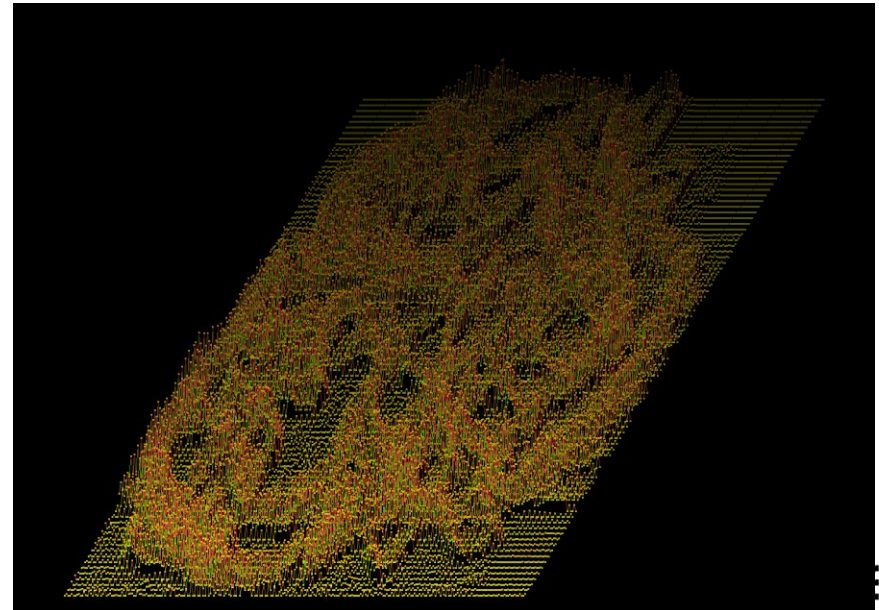
## Biometrics

- Virtual images
- Structural alphabet
  - Describing blocks and sequences of amino acids



## 3D Metrics

- Digital images as Input
  - Visual comparisons
  - Metric quantifications
- Mathematical algorithms

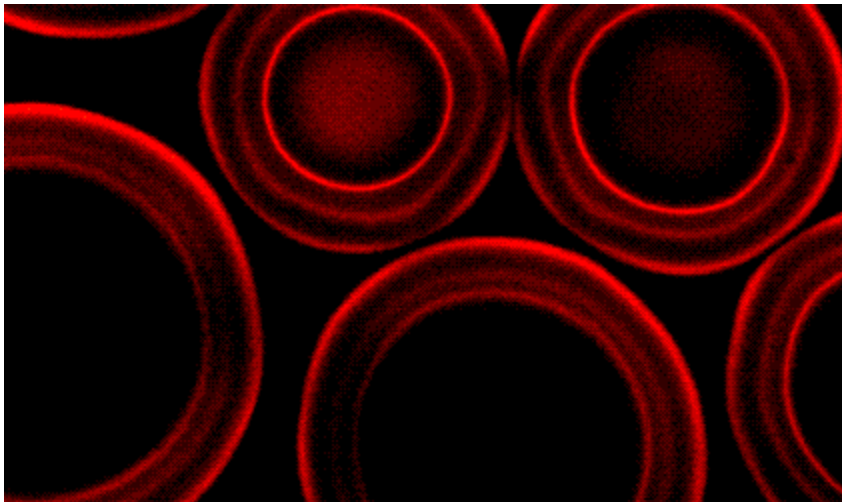


# Analyzing Proteins

## Biometrics

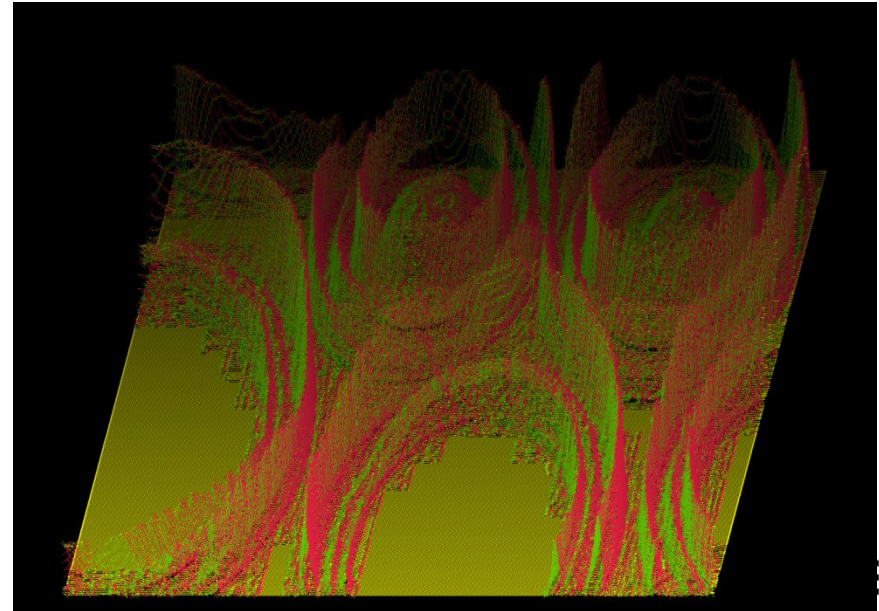
- Structures in space
  - sequence, blocks
- Processes in time
  - changes

Hen egg lysozyme – Nature



## 3D Metrics

- Vocabularies of
  - image components
  - proteins
- Numerical data bases

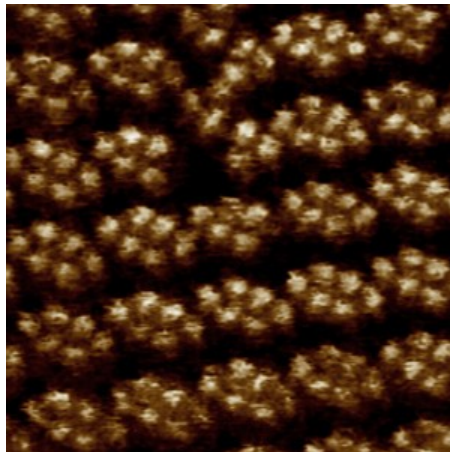


# Deepening Analysis

Our “software vision” produces “visual 3D” for the human eye: new perspective, new depths, new visual effects for clarity of texture and patterns.

## Digital Images

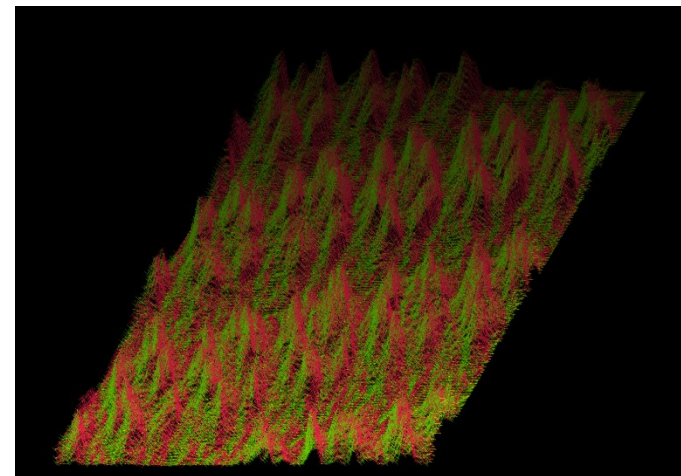
- Structural alphabet
  - blocks and sequences
  - amino acids and proteins



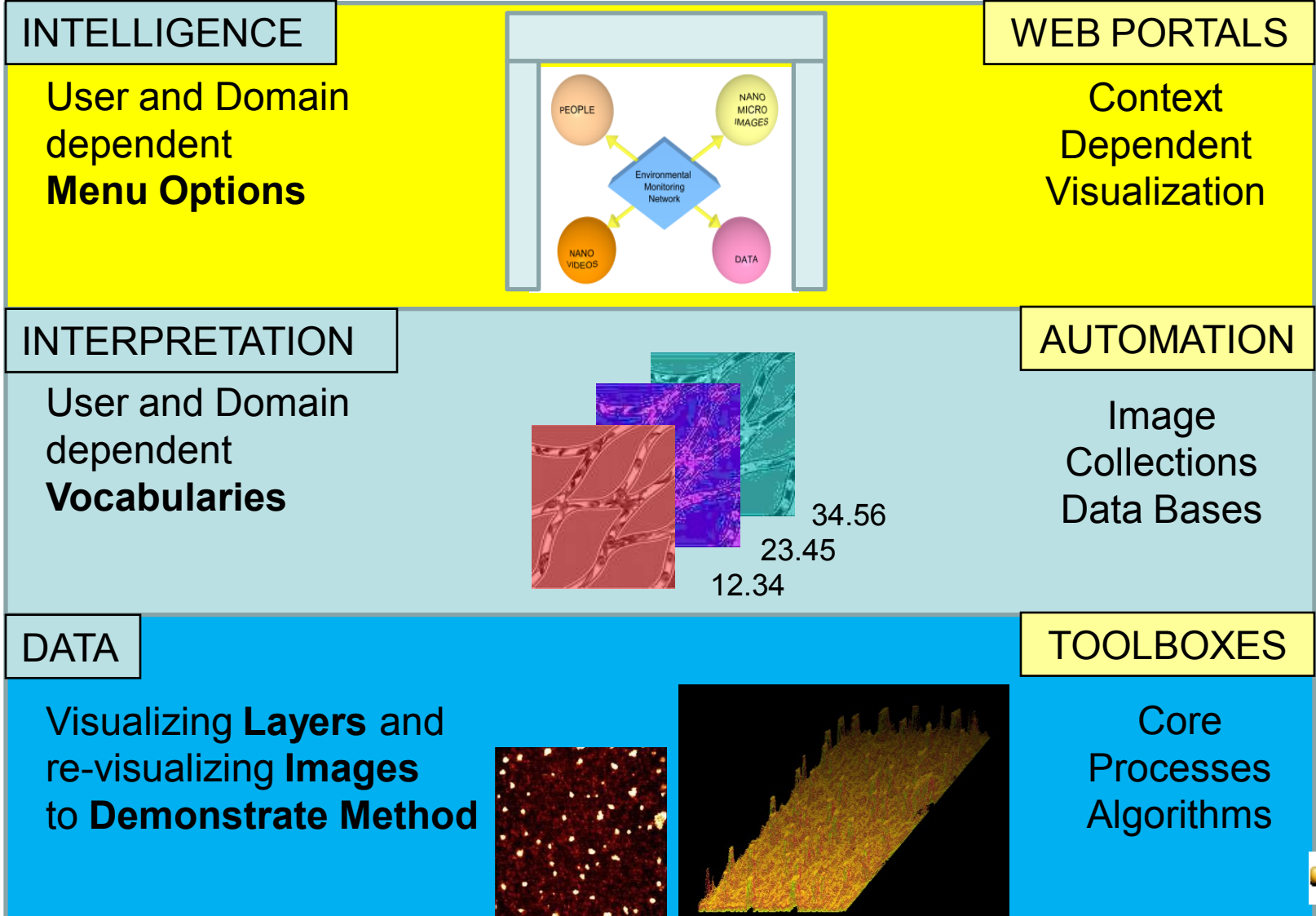
Ompf  
protein  
crystal -  
JPK

## Measuring Comparisons

- Numerical algorithms
  - Visual comparisons
  - Metric quantifications



# Human + Software Expertise





# Seeing & Measuring

## Human Vision

- “**Visual** 3D” is for overall impressions of few images
- Automatic interpretations
- Whole images
  - Associated tags
  - Descriptors
- Image components
  - Associated descriptions
  - Expert values

## Software Vision

- “**Metric** 3D” is for more detail in many images
- Automating mass analysis
- Digital Image Indicators
  - Sorting
  - Ranking
- Digital Image Metrics
  - Upper / lower limits
  - Selecting decision criteria





# 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' => deeper protein analysis  
by quantifying the characteristics of proteins

- Value added seeing from comparing virtual with microscopic images
  - Higher order comparisons across different microscopes
  - Consistent automation of retrieving relevant images.
- 
- More is on
    - <http://3dmetrics.co.uk>
    - <http://3dmetrics.wordpress.com>
  
  - Or by email from
    - [sabine@3dmetrics.co.uk](mailto:sabine@3dmetrics.co.uk)
    - T: 020 7328 3701
    - M: 07968 039 141

