

AUTOMATING ANALYSIS

...and making it work

DEFORMALYZE

- **Experts in**

- Computed Tomography
- Image analysis
- Statistics
- Data mining
- Mathematical modelling

- **Services**

- Consultancy
- Data analysis
- Software development
- Algorithms
- Customized systems



OUTLINE

CT IMAGE ANALYSIS ?

CASE: PIGCLASSWEB

ISSUES TO CONSIDER

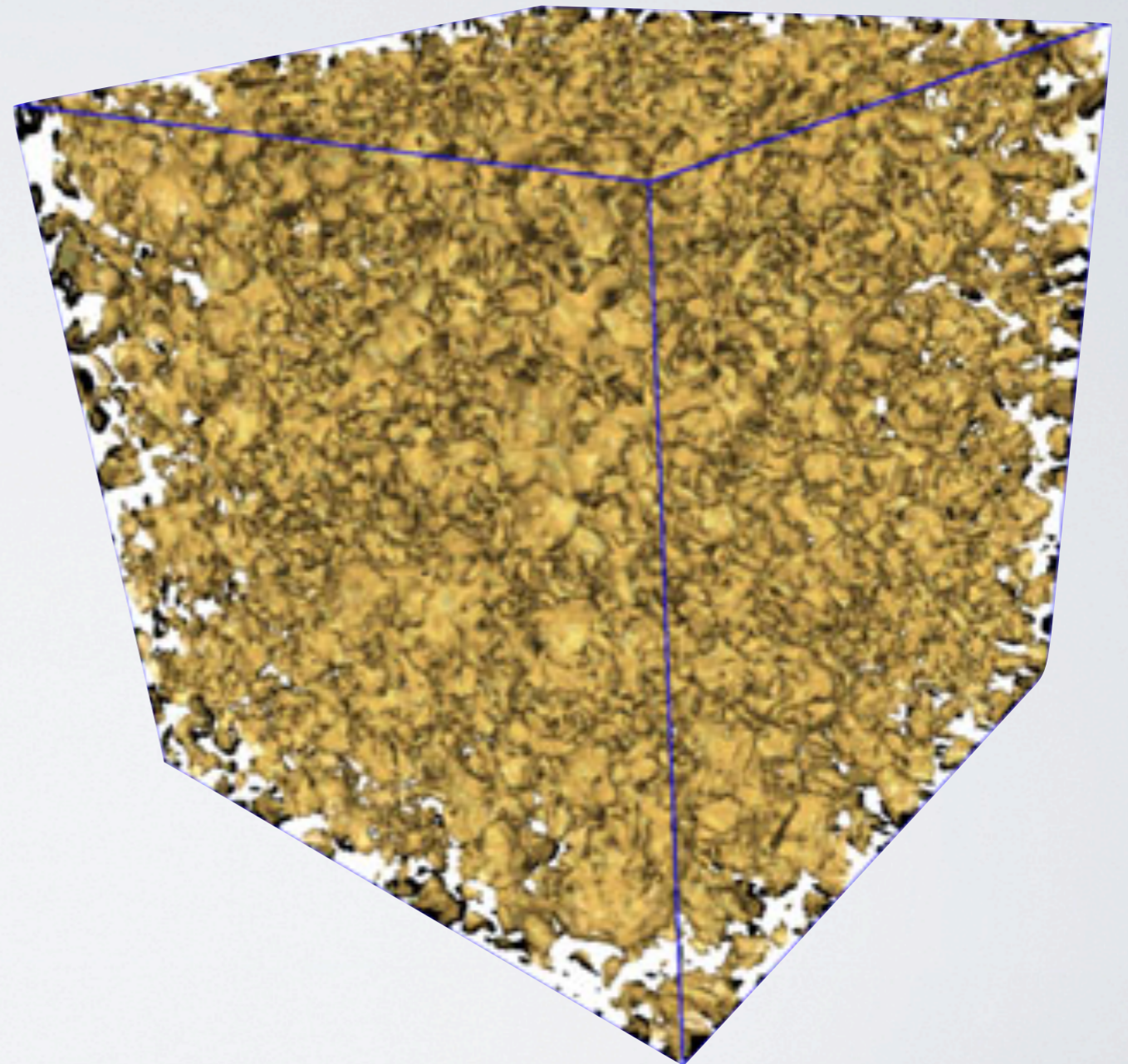


Extraction of Information

ANALYSIS ?

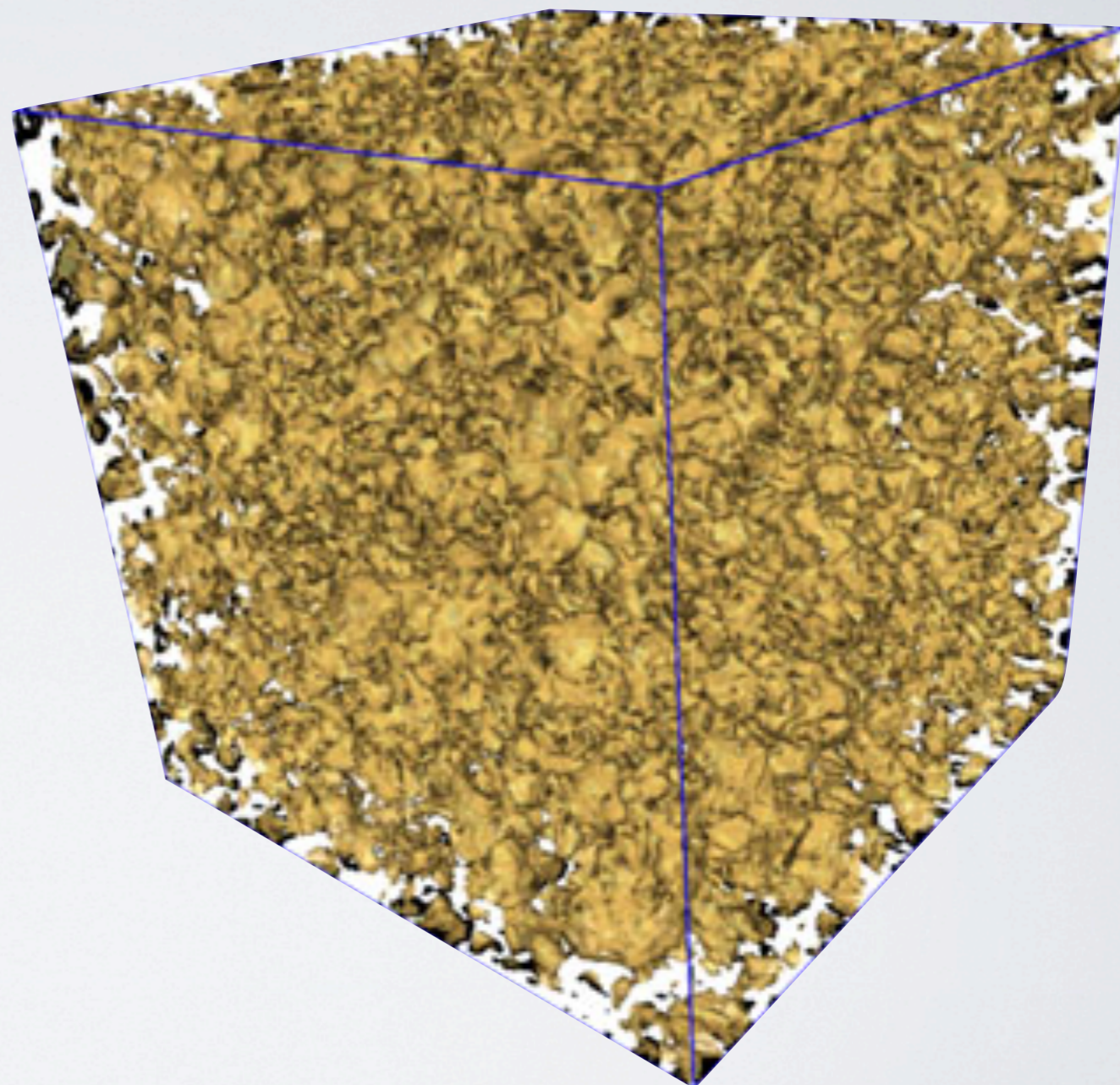
CT IMAGE ANALYSIS

- Materials Science



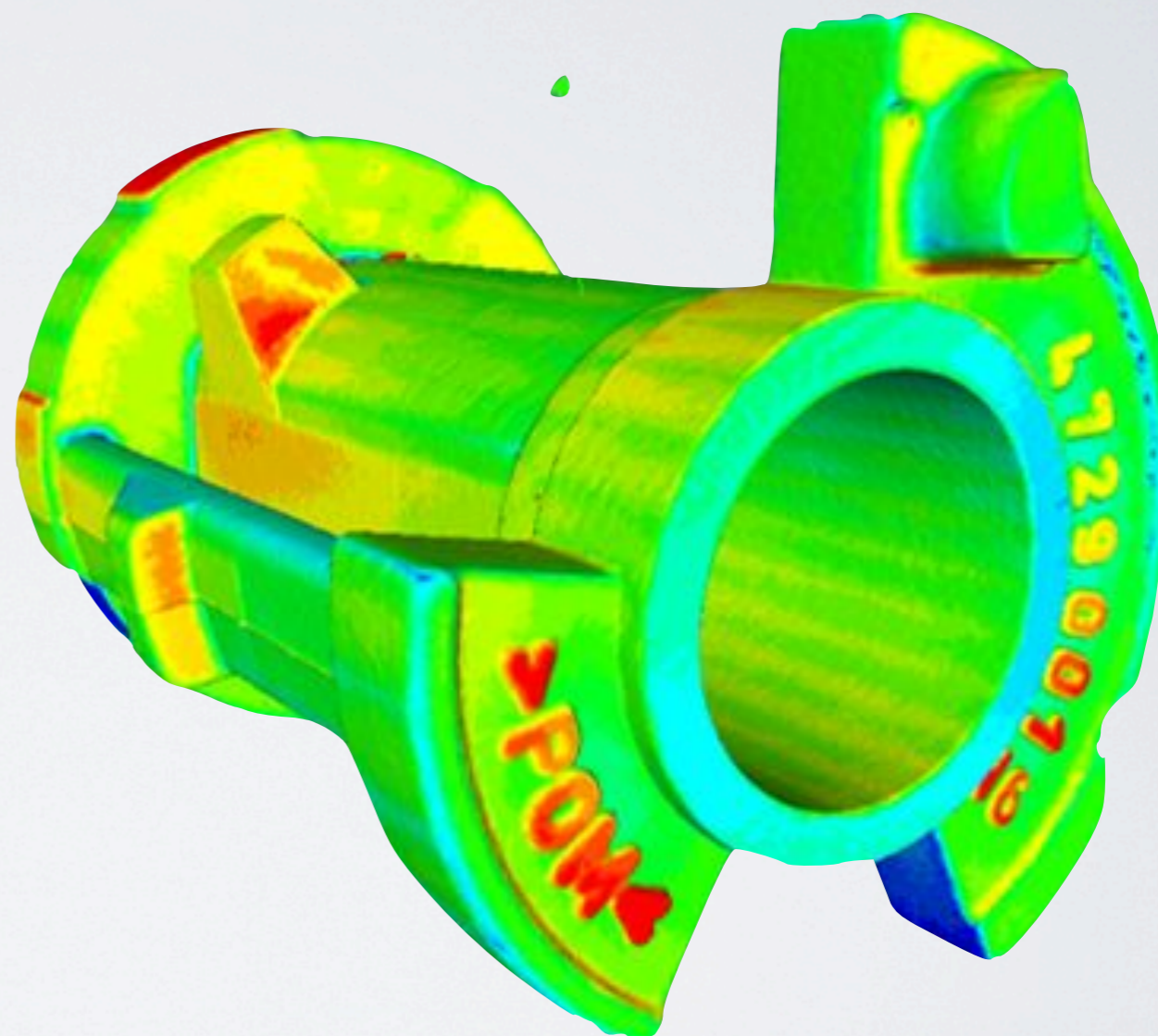
CT IMAGE ANALYSIS

- Materials Science
 - Grain size



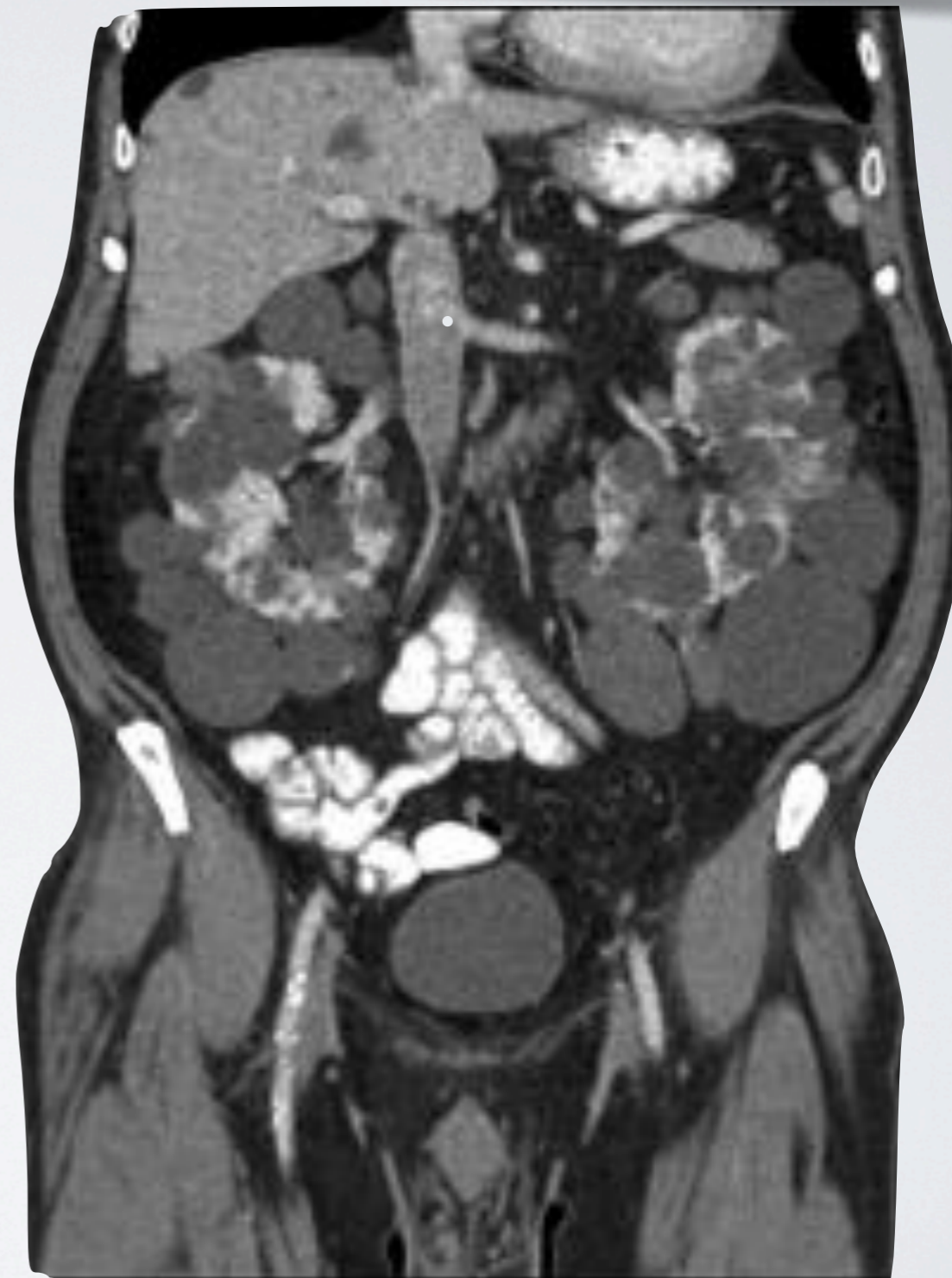
CT IMAGE ANALYSIS

- Materials Science
 - Grain size
- Metrology
 - Wall thickness



CT IMAGE ANALYSIS

- **Materials Science**
 - Grain size
- **Metrology**
 - Wall thickness
- **Medical**
 - Tumor detection



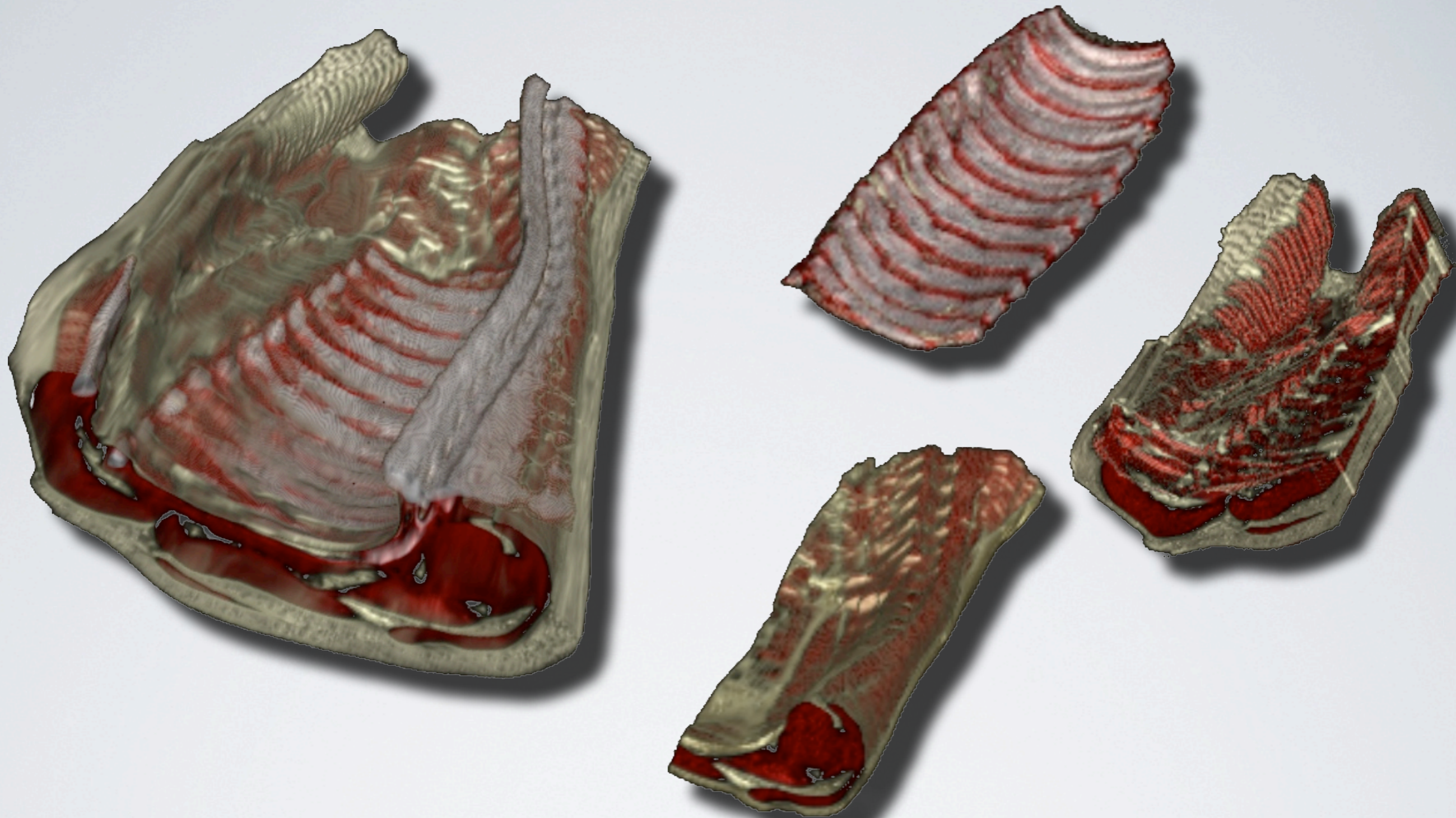
CT IMAGE ANALYSIS

- **Materials Science**
 - Grain size
- **Metrology**
 - Wall thickness
- **Medical**
 - Tumor detection
- **Industrial**
 - Meat quality



CASE: PIGCLASSWEB

The screenshot displays the PigClassWeb web application. At the top, there is a browser tab labeled 'PigClassWeb' and a yellow header banner with the logo 'OPUS+ Cutting' and a pig illustration. On the left, a 'Menu' sidebar contains options: 'Dataset Upload Cutting', 'Add user Users', 'Logged in as admin', and 'Log out'. The main area shows a 3D CT scan of a pig with two vertical cutting planes, one red and one yellow. Below the scan are two cross-sectional views of the pig, each with a '0 mm' label in a colored box (red and yellow). At the bottom of the interface are 'Apply' and 'Export' buttons. The footer text reads: '© Danish Meat Research Institute 2010 - Version: 1.6 29-03-2010'.



CASE: PIGCLASSWEB

- System for
 - ✓ Retrieving
 - ✓ Storing
 - ✓ Processing
 - ✓ Analysing
- CT scans of pig carcasses

- Web-based interface for
 - ✓ Visualisation
 - ✓ Simulation
 - ✓ Statistical analysis
- In the browser

- Developed for



CASE: PIGCLASSWEB



Object

Data Acquisition

Data Transmission

Processing

Storage

Simulation



CASE: PIGCLASSWEB

Object

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CASE: PIGCLASSWEB

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CASE: PIGCLASSWEB

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Simulation

The screenshot shows the 'PigClass Upload Client 2.0' application. The main window has a 'File' menu and fields for 'Server' (http://pigclass.deformalyze.com), 'Username' (admin), 'Import Folder' (mes/Server/data/DMRI/Norge_2008), and 'Password'. An 'Upload' button is visible. A 'Status' dialog box is open, titled 'Searching for Dicom files...', with a progress bar at 16% and a 'Cancel' button. Below the dialog is a table with columns: Std., ID*, Name*, No of Slices, Upload, and Status.

Std.	ID*	Name*	No of Slices	Upload	Status
<input checked="" type="checkbox"/>	2089...	208989 47,...	2	150	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2090...	209006 38,...	2	143	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2090...	209028 47,...	2	153	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2090...	209072 44,...	2	150	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2090...	209086 42,93 kg	2	149	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2090...	209090 43,73 kg	2	153	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2090...	209096 44,63 kg	2	153	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2090...	209098 43,23 kg	2	146	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2091...	209155 42,53 kg	2	149	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2092...	209201 35,33 kg	2	147	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2092...	209210 43,53 kg	2	147	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2092...	209234 41,98 kg	2	143	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2092...	209281 39,13 kg	2	141	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2092...	209290 40,33 kg	2	152	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2117...	211714 49,53 kg	2	152	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2117...	211726 46,98 kg	2	148	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2117...	211775 39,28 kg	2	143	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2117...	211798 38,23 kg	2	146	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2118...	211809 39,58 kg	2	139	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2118...	211850 37,88 kg	2	137	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2118...	211860 45,53 kg	2	156	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2118...	211864 41,38 kg	2	141	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2119...	211908 39,33 kg	2	142	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2119...	211909 41,83 kg	2	145	<input type="checkbox"/>

CASE: PIGCLASSWEB

Object

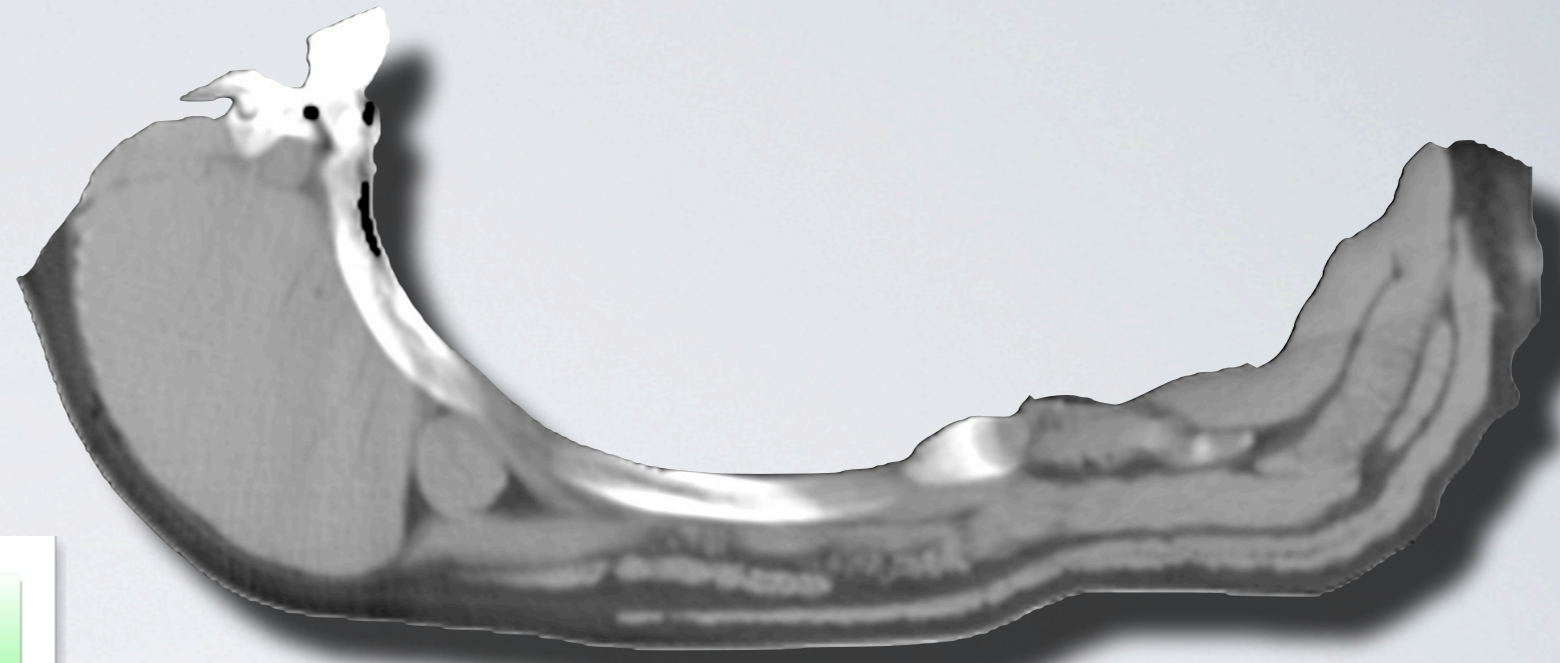
Data Acquisition

Data Transmission

Processing

Storage

Simulation



CASE: PIGCLASSWEB

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DATA ACQUISITION

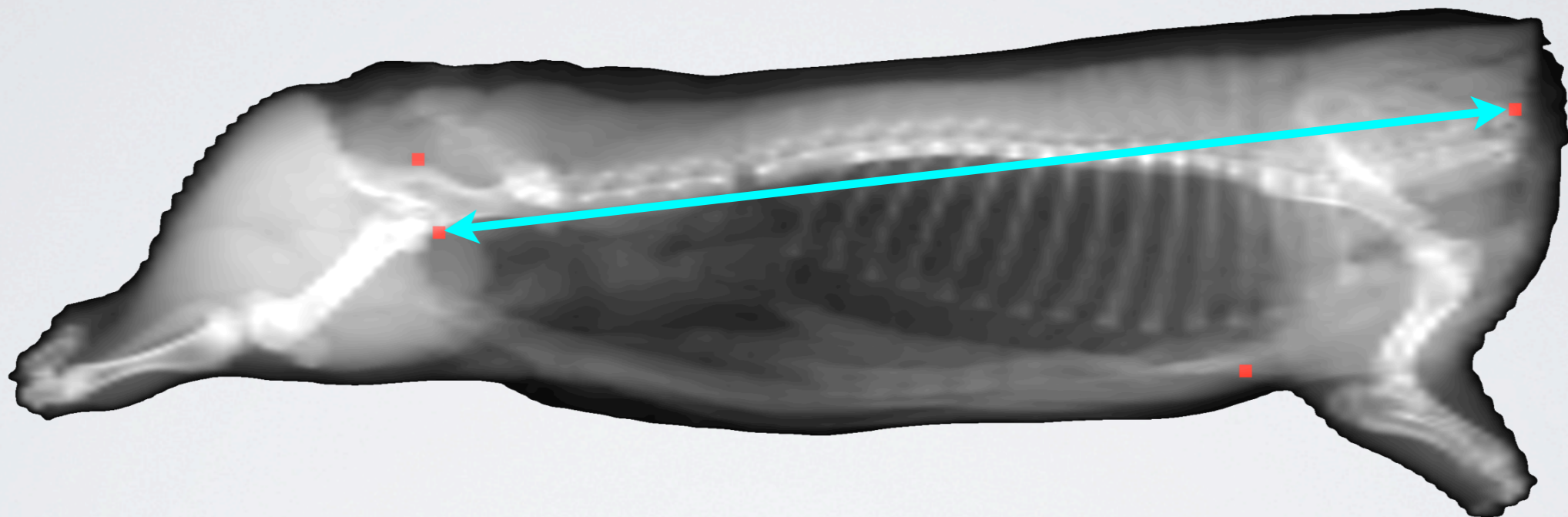
ISSUES TO CONSIDER



- Position object
 - Consistently
 - Minimize artefacts
- Optimal settings
 - Resolution / Amount of data
 - Energy
 - Price
 - Reconstruction algorithm
- Operator
 - Discipline
 - Immediate feedback helps

DATA PROCESSING

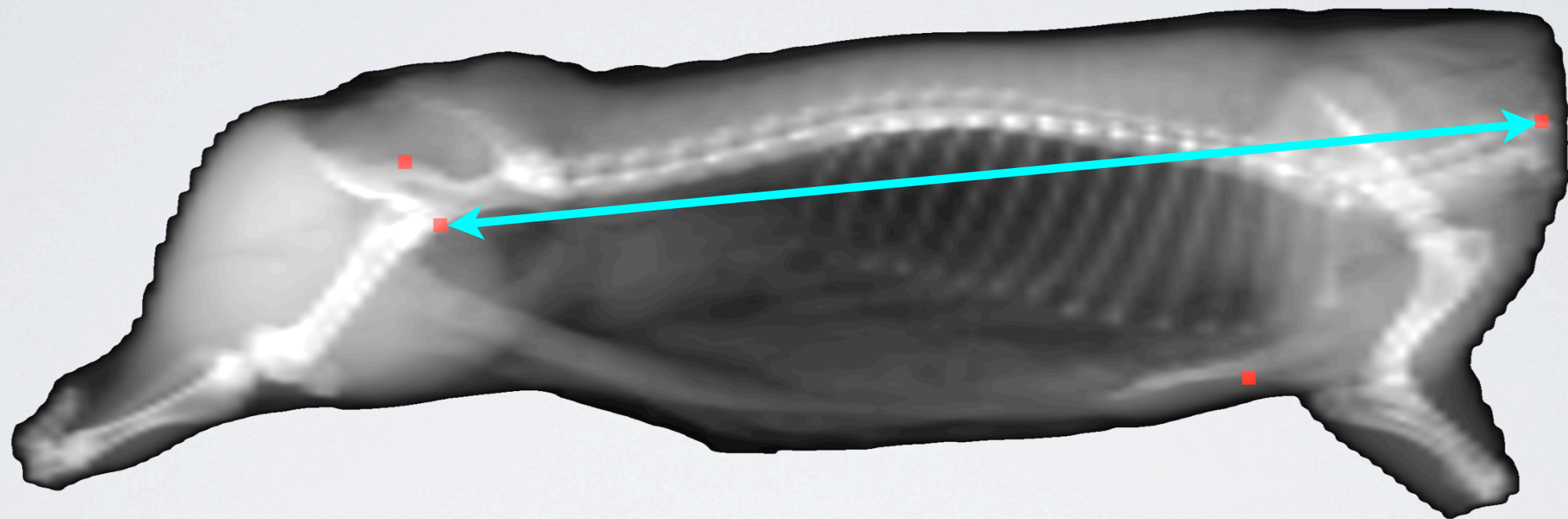
ISSUES TO CONSIDER



CHOICE OF COORDINATE SYSTEM

DATA PROCESSING

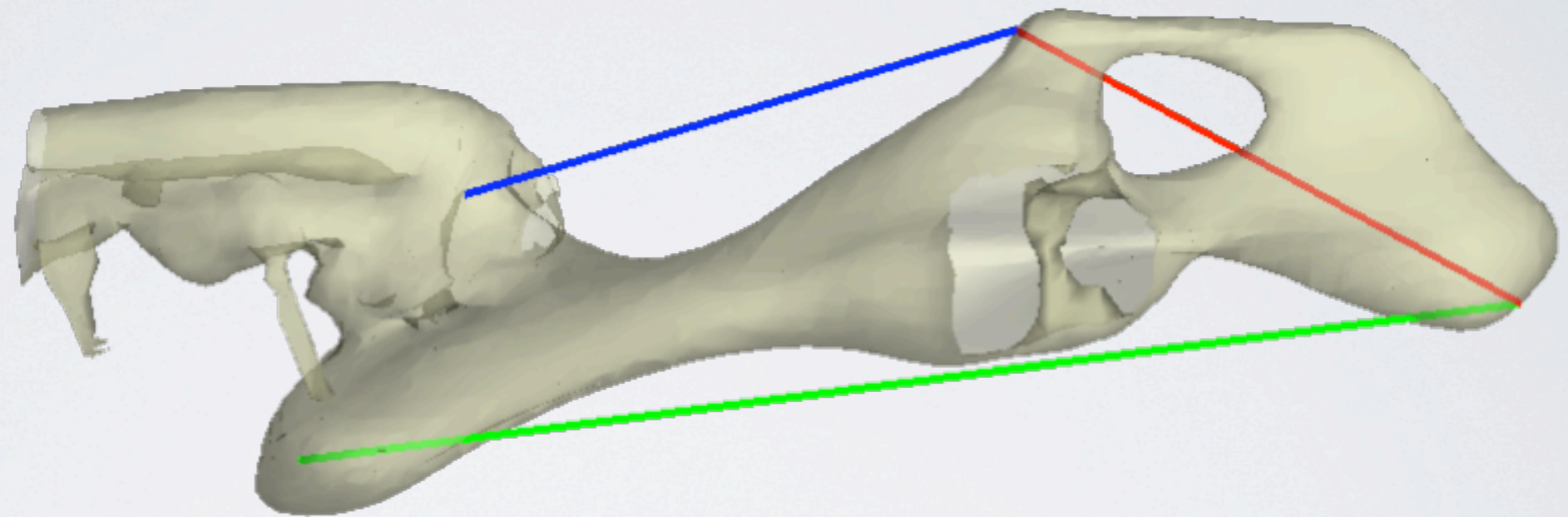
ISSUES TO CONSIDER



CHOICE OF COORDINATE SYSTEM

DATA PROCESSING

ISSUES TO CONSIDER



MEASUREMENT REPEATABILITY

USABILITY

ISSUES TO CONSIDER

- Speed of response
 - Reduce amount of data
 - Graceful degradation
 - Optimize by precalculation
- K.I.S.S.
 - Visua-less
 - Minimize click-ratio



AUTOMATION

Key Selling Points !



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- Less operator workload



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 - Minimize drag'n'drop operations



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 - Increased volume - more data



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- **Population based information**



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 - Sorting



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 - Automatic QC



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 - Increased volume - more data
 - Focus time on what is important
- **Population based information**
 - Sorting
 - Automatic QC
 - Product insight



AUTOMATION

Key Selling Points !

- **Less operator workload**
 - Minimize drag'n'drop operations
 - Increased volume - more data
 - Focus time on what is important
- **Population based information**
 - Sorting
 - Automatic QC
 - Product insight
- **Data re-use!**

