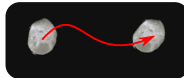


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Position



Volume



Shape



Surface area

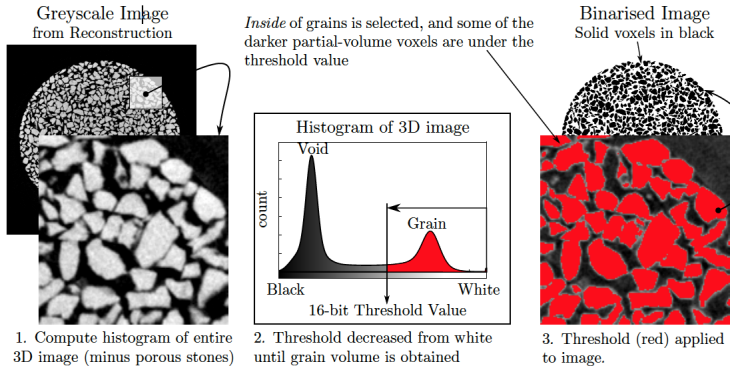


Contacts



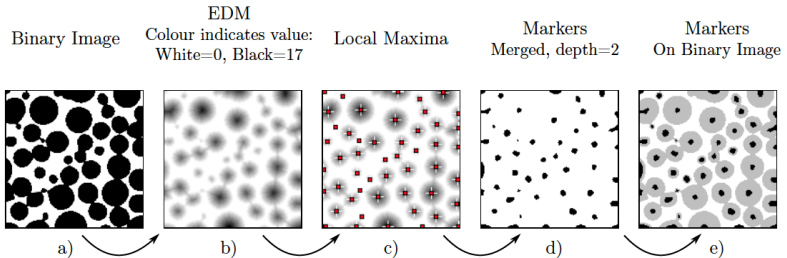
Segmentation

**courtesy of E. Ando*

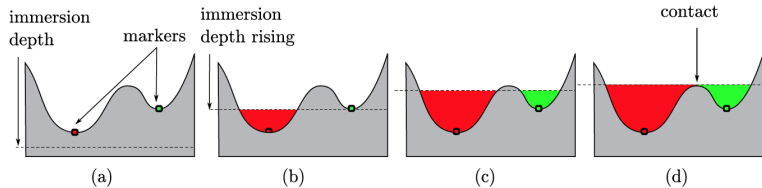


Segmentation

**courtesy of E. Ando*

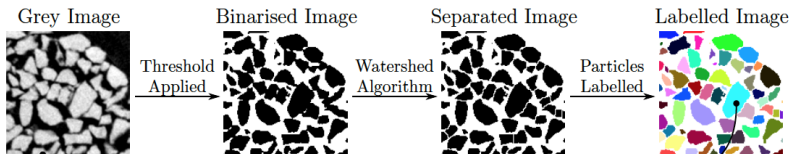


**courtesy of E. Ando*



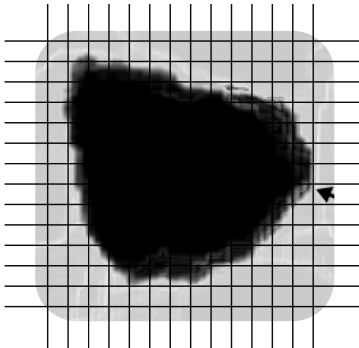
Segmentation

**courtesy of E. Ando*



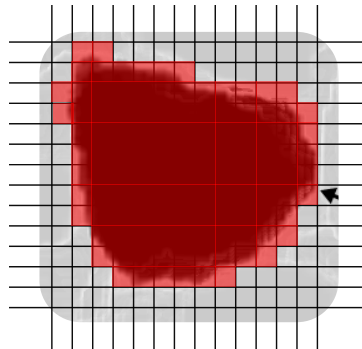
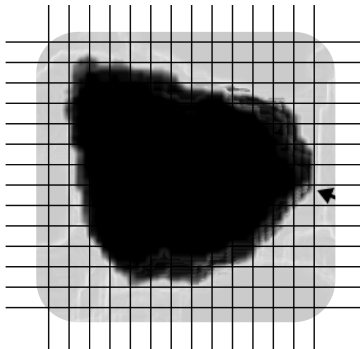
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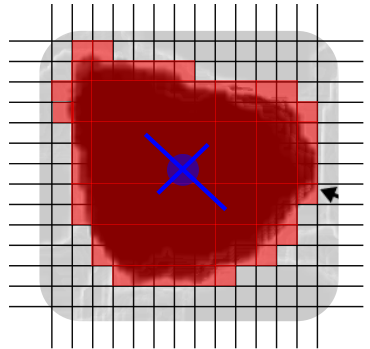
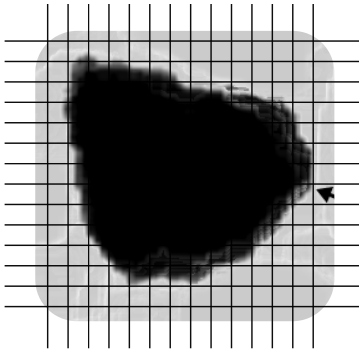
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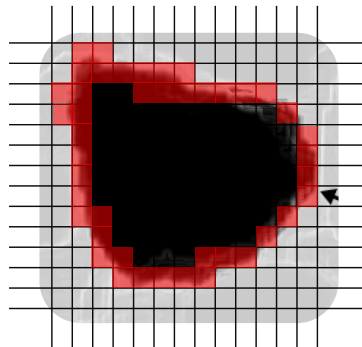
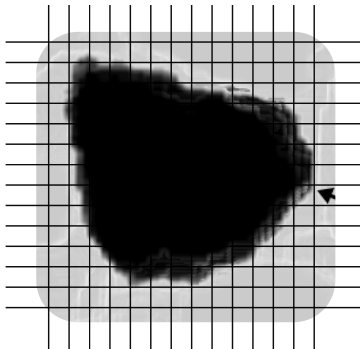
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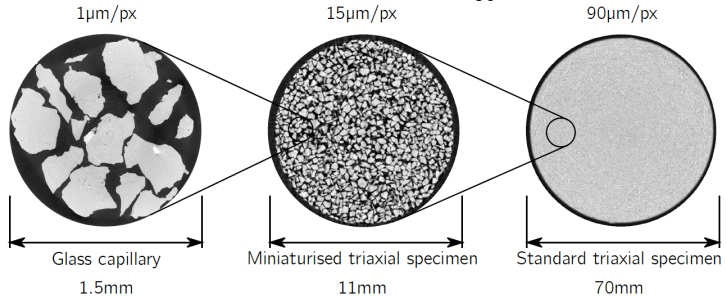


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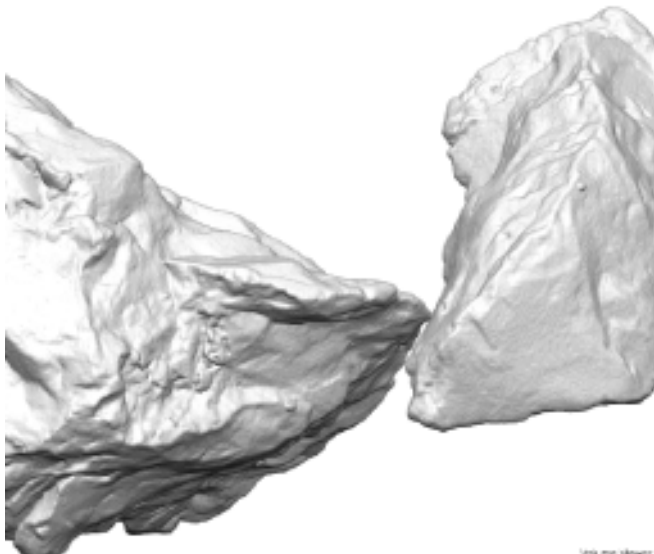
Hostun HN31 Sand ($D_{50}=328\mu\text{m}$)



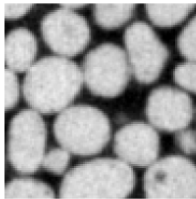
Please note: the zoom-in illustrations are merely to relate the sizes, the scans shown are of different specimens

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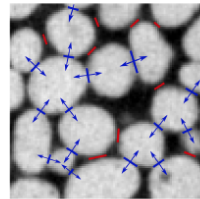
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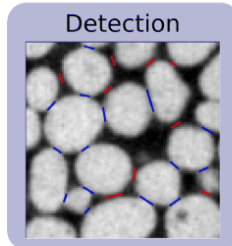
X-ray tomography at a resolution for triaxial tests



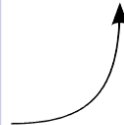
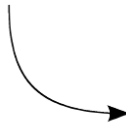
Imaged
Microstructure



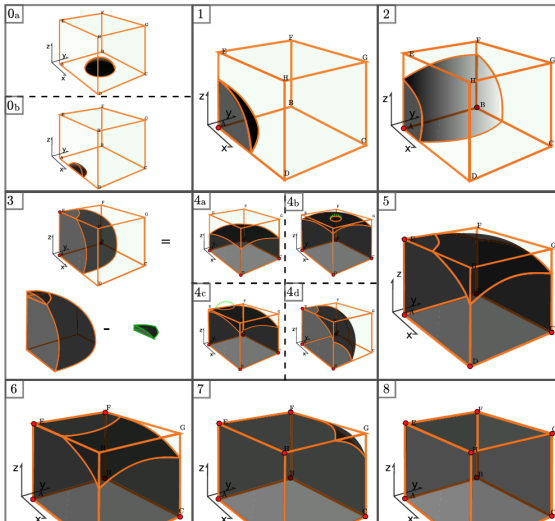
Orientation

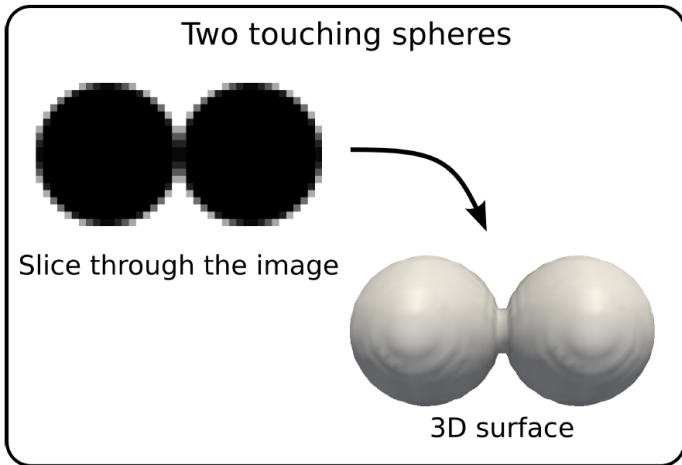


Detection

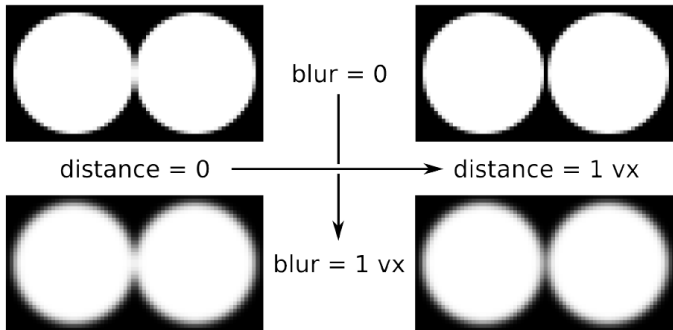


an example of ground-truth case: "kalisphaera"



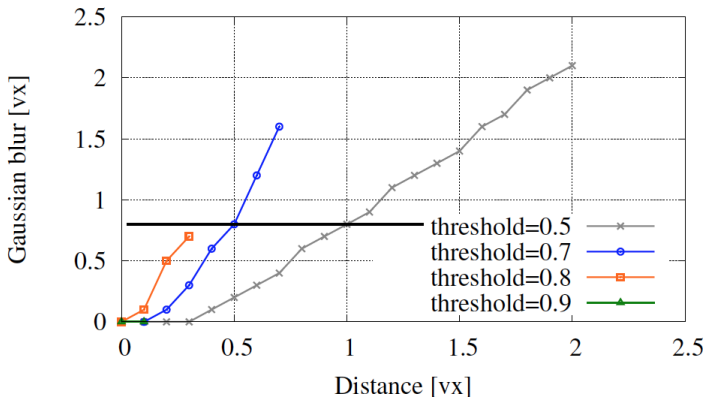


Contact detection analysis



**courtesy of E. Ando, M. Wiebke*

Contact detection
Points indicate when a contact is found
4000 random distributions



- A number of quantities, relevant to geomechanics (and analogous materials) can be *quantified*, starting from CT images, such as porosity, fracture networks, geometrical features of grains...
- The quality of this measures often matters far more than the resolution itself. Sometimes the resolution of these measures is below the pixel size.
- There are sources of error at each step of the imaging process, each a Pandora's box. Minimizing them is key but even more important is their acknowledgement and quantification, using ground-truth reference cases.

What else can we do?

- If a process is occurring we can take can compare states. .
Not only to follow processes but also to improve the “quality” of our information. → E.Ando’s presentation on 4D image analysis
- By having more diverse information. (e.g. neutron + x-rays, as in D50 at ILL)

