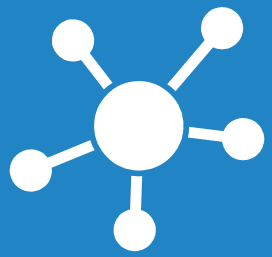


REAL-WORLD EXAMPLES

scikit-image is used in **research**, **industry** & **education**

arXiv.org > cs > arXiv:1210.3404 Search

Computer Science > Computer Vision and Pattern Recognition

A polygon-based interpolation operator for super-resolution imaging

Stéfan J. van der Walt, B. M. Herbst

(Submitted on 12 Oct 2012 (v1), last revised 15 Oct 2012 (this version, v2))

We outline the super-resolution reconstruction problem posed as a maximization of probability. We then introduce an interpolation method based on polygonal pixel overlap, express it as a linear operator, and use it to improve reconstruction. Polygon interpolation outperforms the simpler bilinear interpolation operator and, unlike Gaussian modeling of pixels, requires no parameter estimation. A free software implementation that reproduces the results shown is provided.

PeerJ

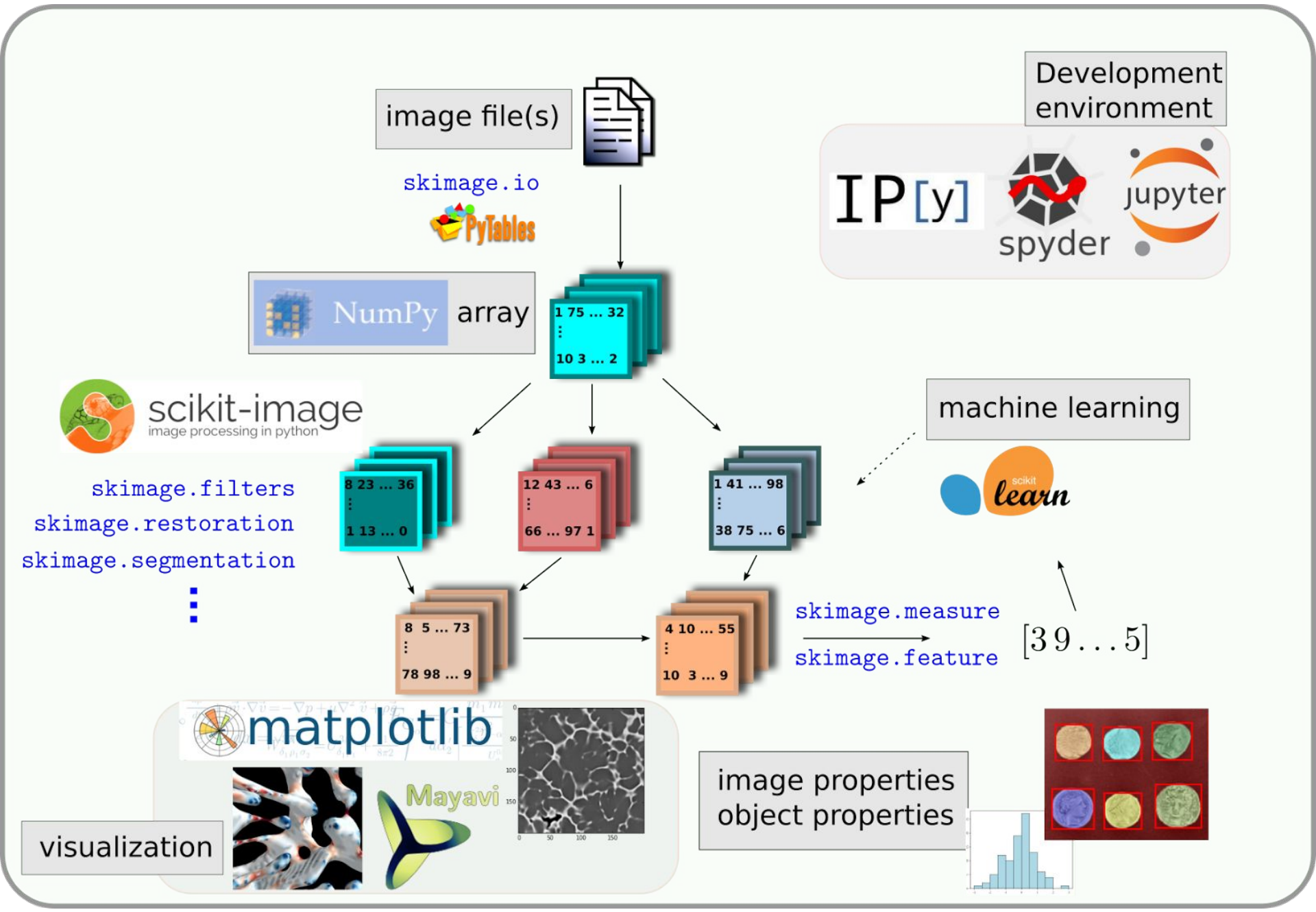
scikit-image: image processing in Python

Stéfan van der Walt[1], Johannes L. Schönberger[2], Juan Nunez-Iglesias[3], François Boulogne[4], Joshua D. Warner[5], Neil Yager[6], Emmanuelle Gouillart[7], Tony Yu[8] and the scikit-image contributors

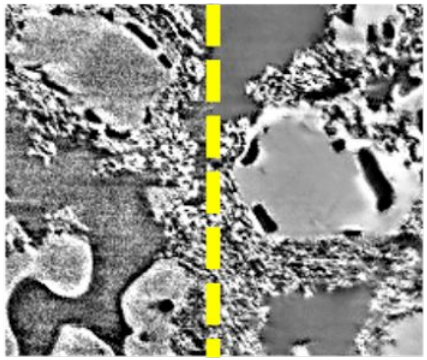
RESEARCH

Analyzing X-ray images in Python with scikit-image

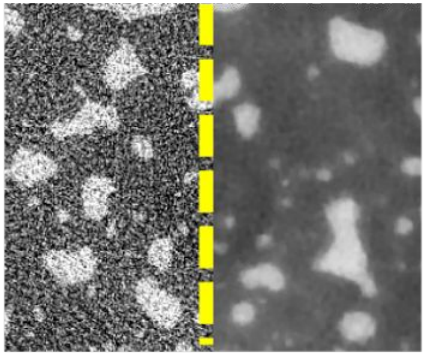
Emmanuelle Gouillart[1*], Juan Nunez-Iglesias[2] and Stéfan van der Walt[3]


Development environment
IP[y]
spyder
jupyter
image file(s)
skimage.io
PyTables
NumPy array
1 75 ... 32
10 3 ... 2
scikit-image
image processing in python
machine learning
scikit learn
skimage.filters
skimage.restoration
skimage.segmentation
8 23 ... 36
1 13 ... 0
12 43 ... 6
66 ... 97 1
1 41 ... 98
38 75 ... 6
8 5 ... 73
78 98 ... 9
4 10 ... 55
10 3 ... 9
skimage.measure
skimage.feature
[39...5]
matplotlib
Mayavi
visualization
image properties
object properties

a) filtering

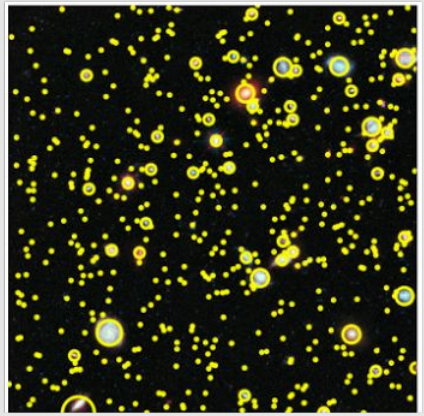


non-local means denoising

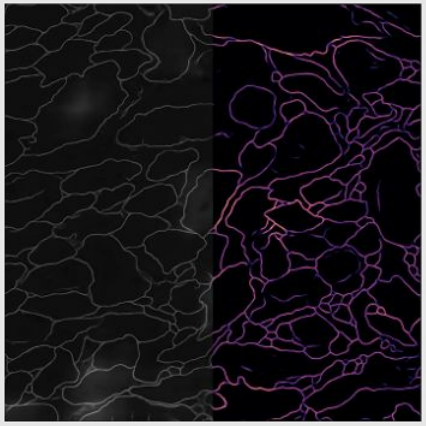


total variation denoising

b) feature extraction

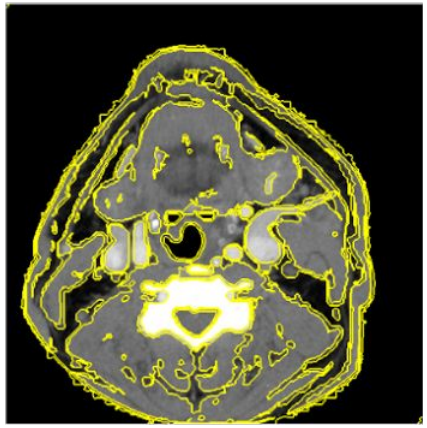


blob detection

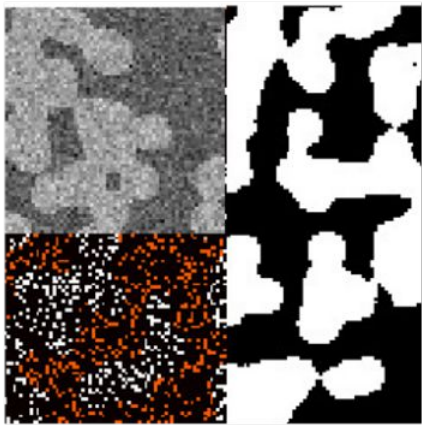


ridge detection

c) segmentation

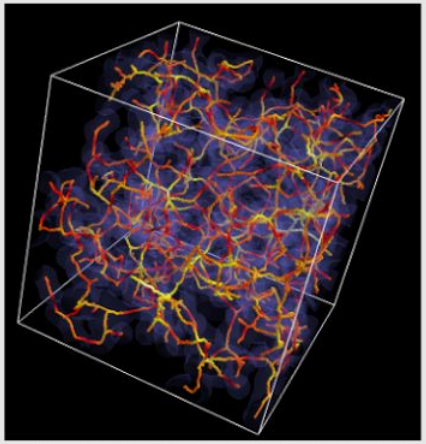


super-pixels

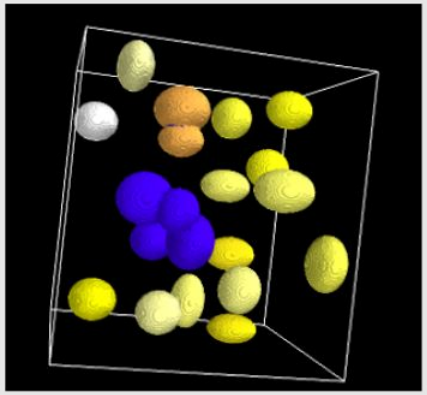


segmentation from markers

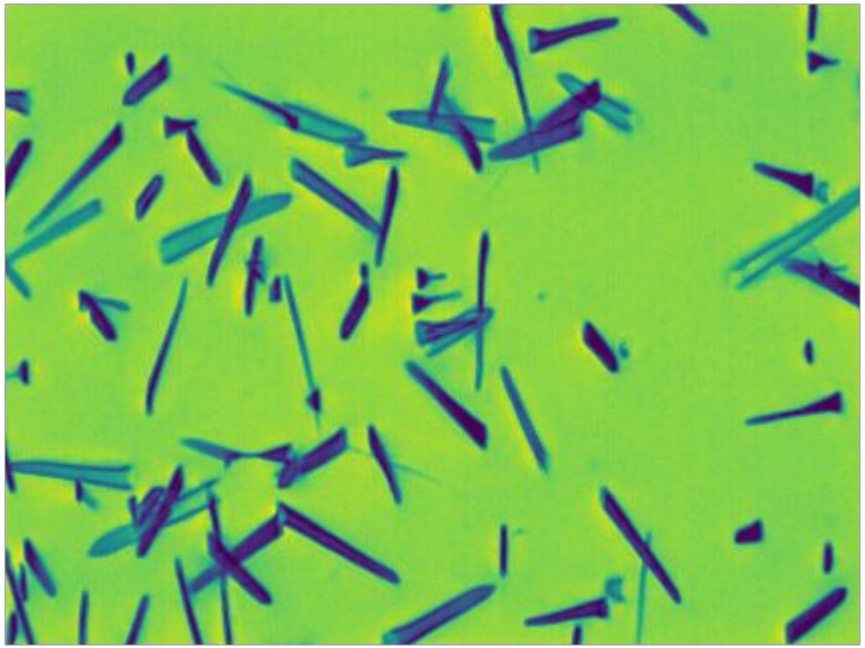
d) measures



skeleton & local diameter



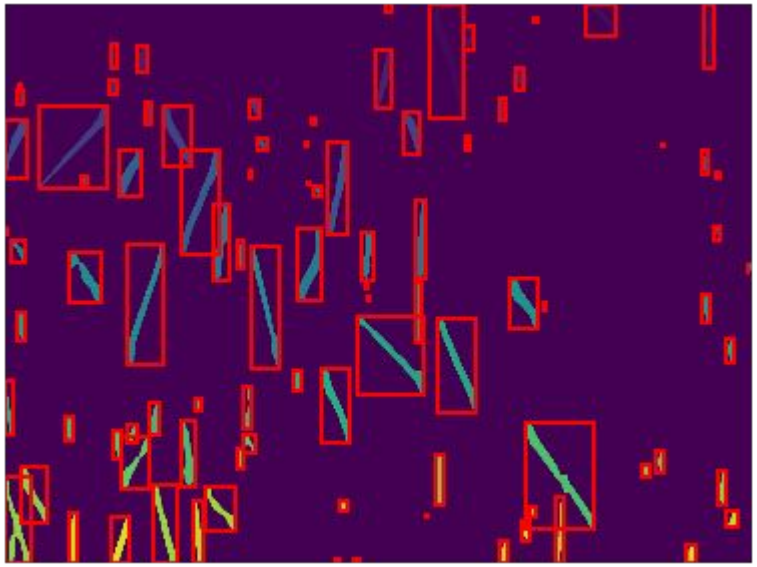
particle properties

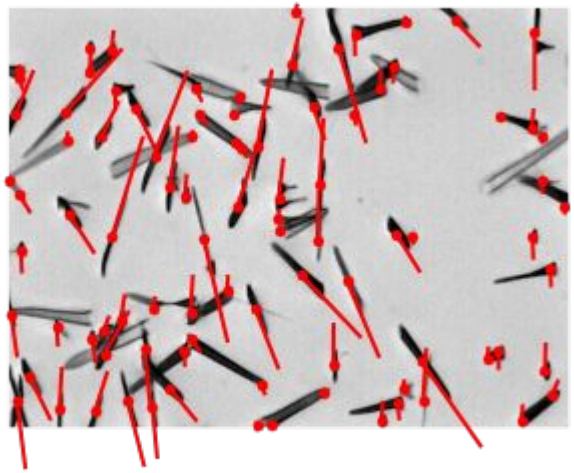


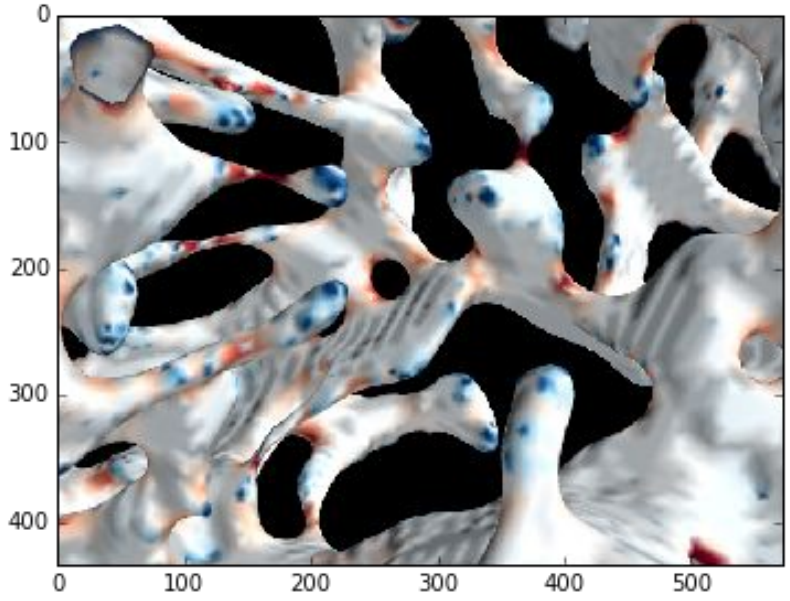
Radiometric Dating

Extract, count, and orientate mineral fission tracks.

Research by **Alexandre Fioravante de Siqueira**. Images courtesy of Raymond Jonchkeere (TU Bergakademie Freiberg, Germany) and Sandro Guedes de Oliveira (Unicamp, Brazil).

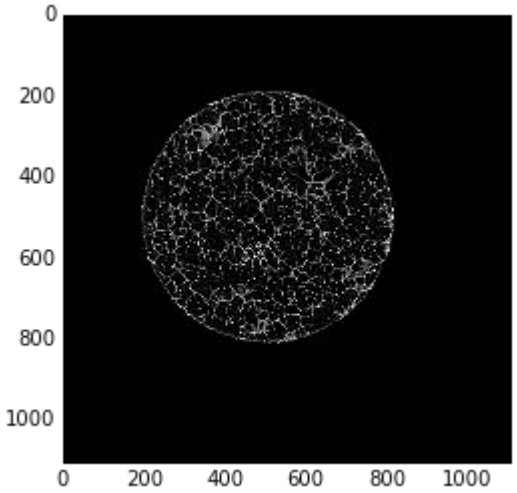


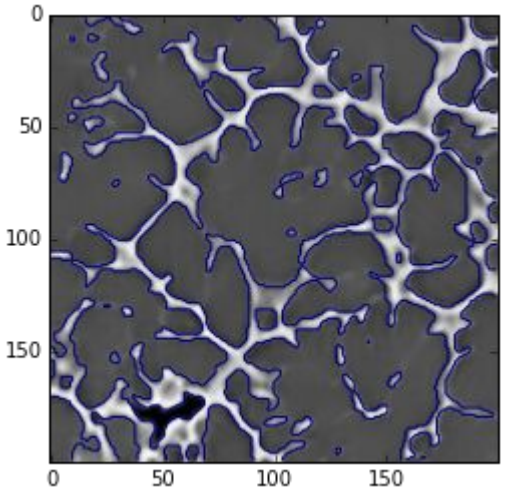




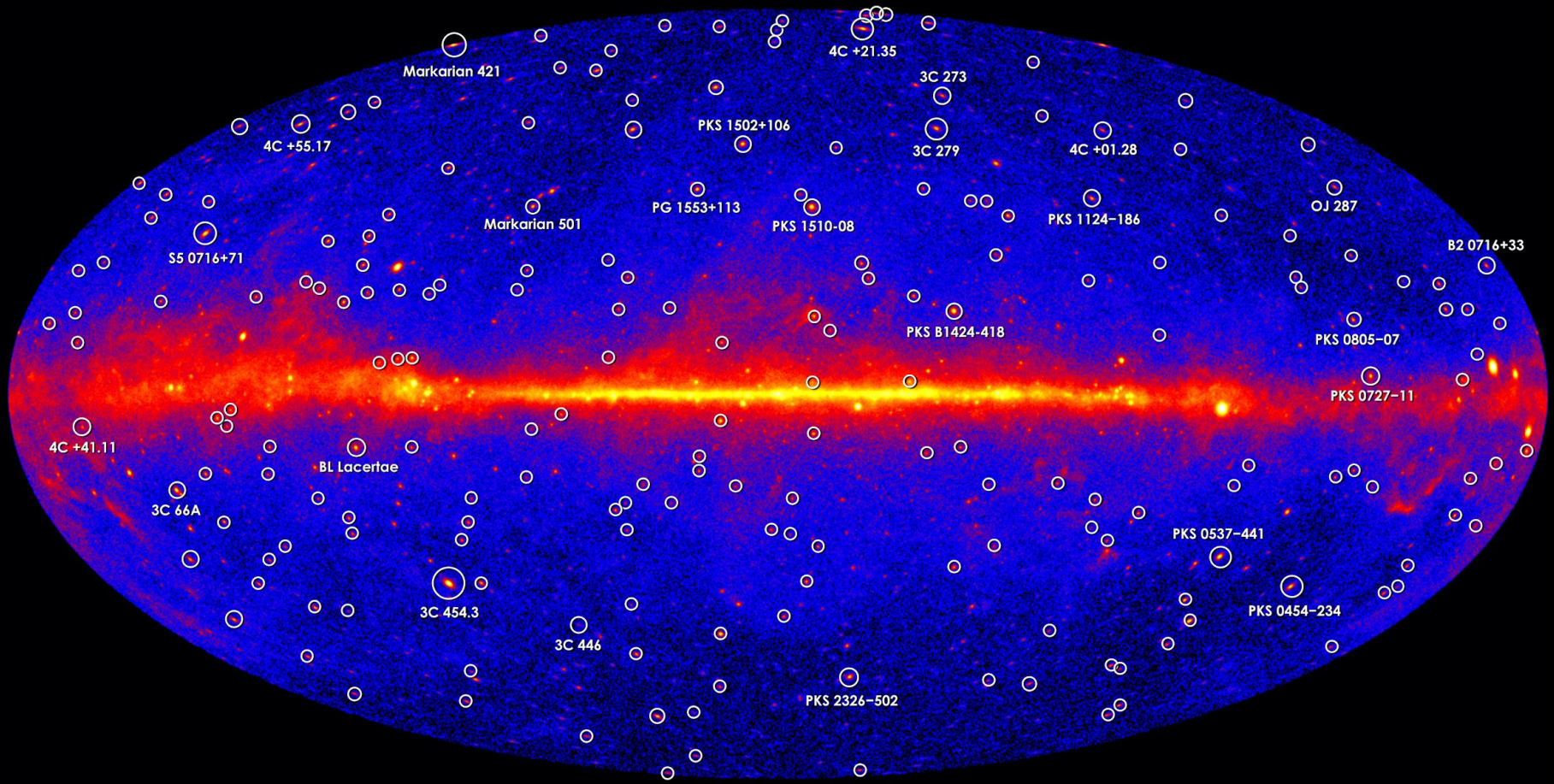
Material sciences

The tomographically scanned object is a drilled cylinder of a metallic alloy with two phases (an aluminium-copper alloy). The goal is to label and visualize pixels of the light phase.





Research by **Emmanuelle Gouillart**. Experimental data acquired by Pierre Lhuissier, Luc Salvo and Elodie Boller on the ID19 tomography beamline of the ESRF synchrotron.

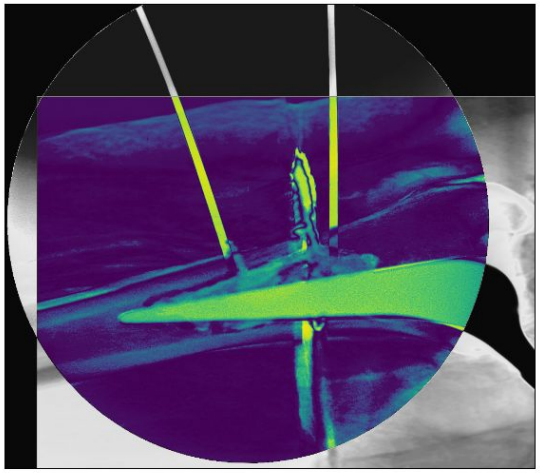


Gammapy uses scikit-image to make source catalogs from these Fermi-LAT images. **Christoph Deil et al**.

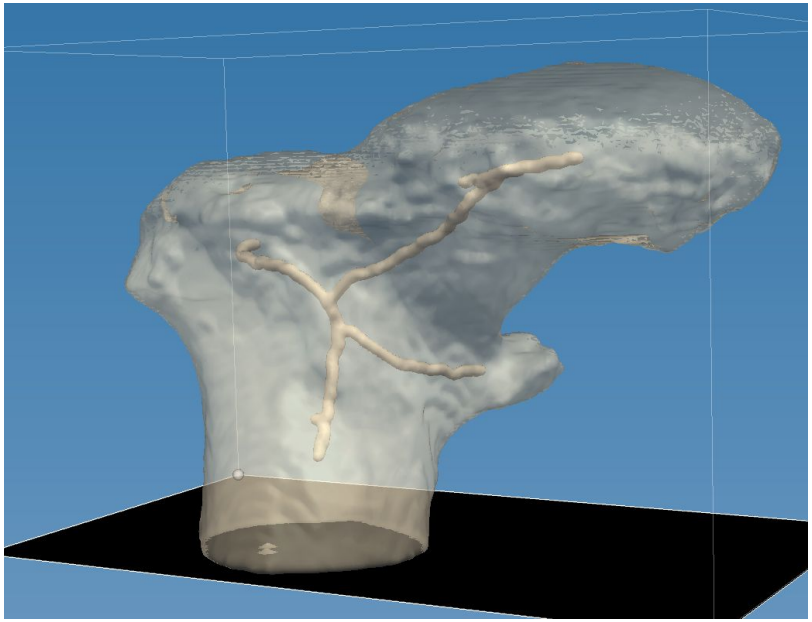
Astronomy

Medical Imaging

Nadav Horesh's company, Visionsense, uses scikit-image to process abd interact with images from their video cameras for endoscopic surgeries.



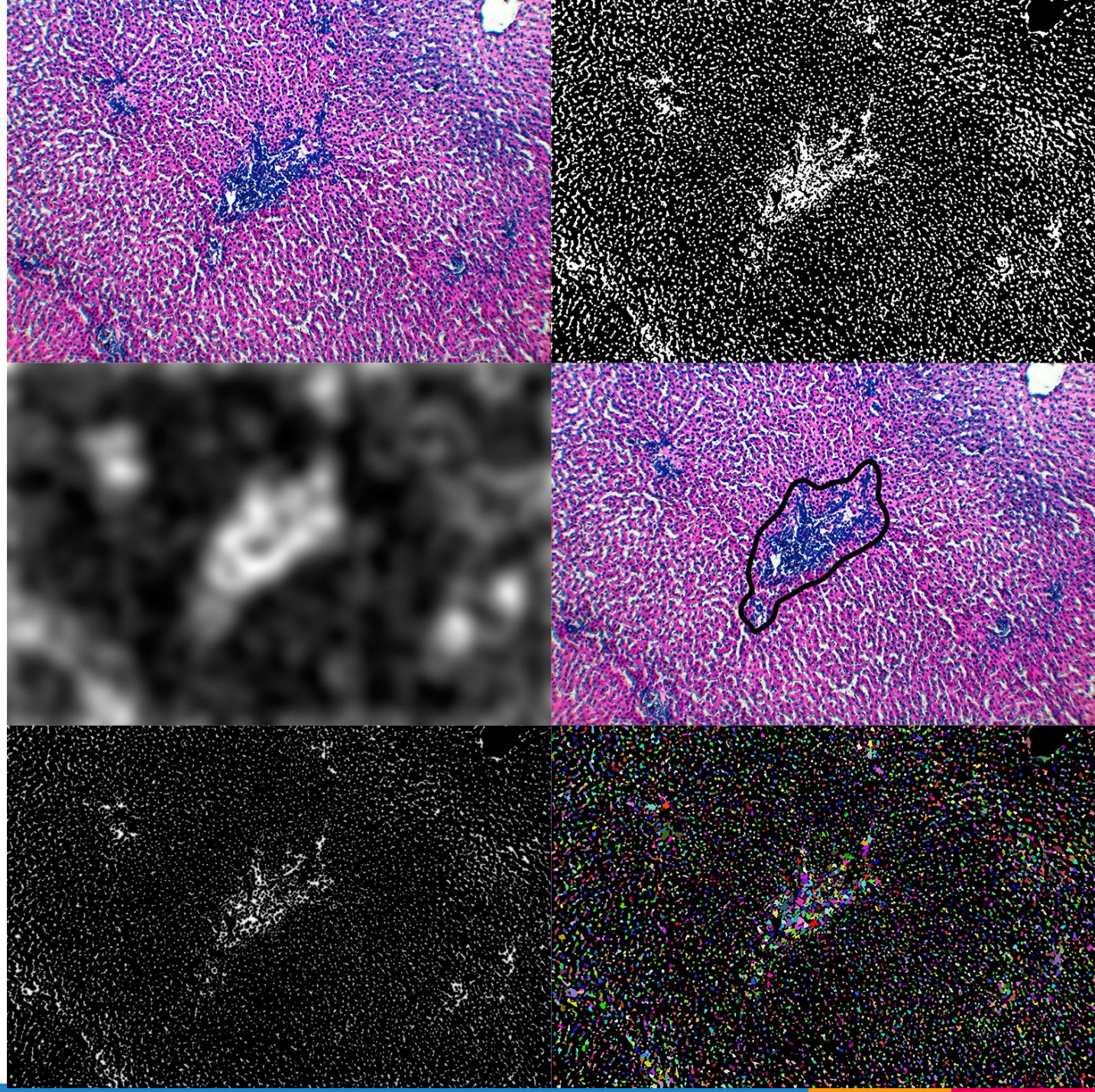
Malan et al. uses scikit-image for image alignment in hip refixation simulations.



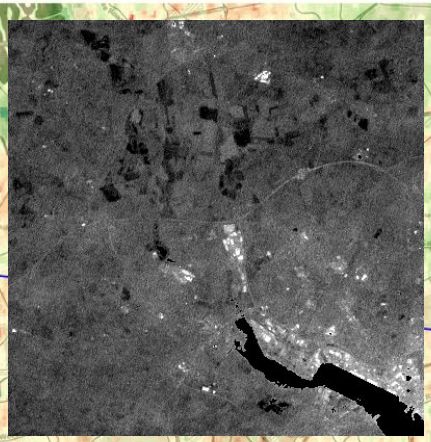
Peter Krekel's Clinical Graphics, uses scikit-image for 3D skeletonization.

Quantitative histology

Research done at **Princeton's Department of Ecology and Evolutionary Biology** by Quentin Caudron and Romain Garnier under PI Andrea Graham.



Satellite imaging



Robin Wilson (2015), *Developing a novel method to retrieve high spatial resolution Aerosol Optical Thickness (AOT) from satellite data*, PhD thesis, University of Southampton, UK

Credits

- Presentation template by SlidesCarnival