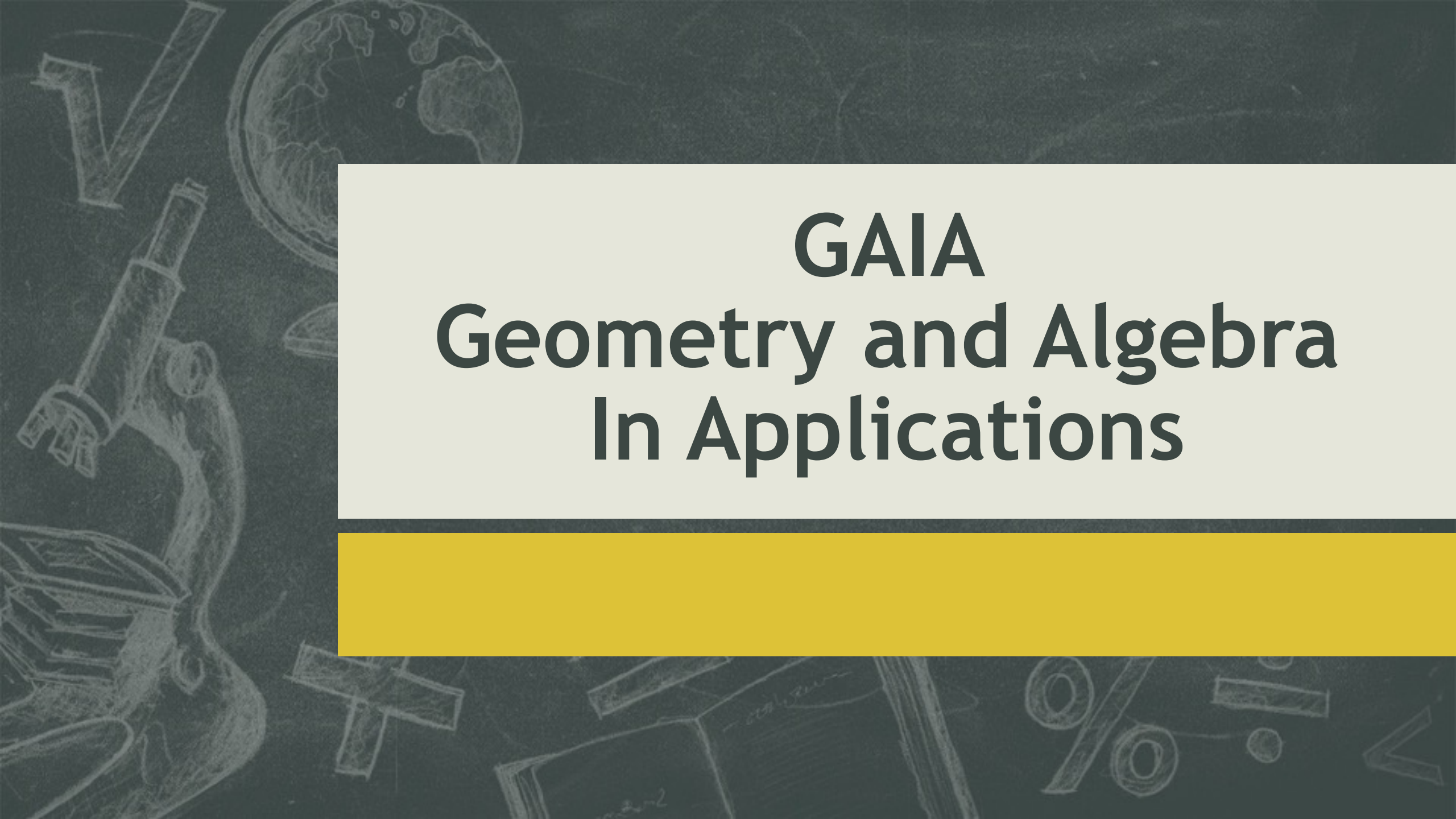
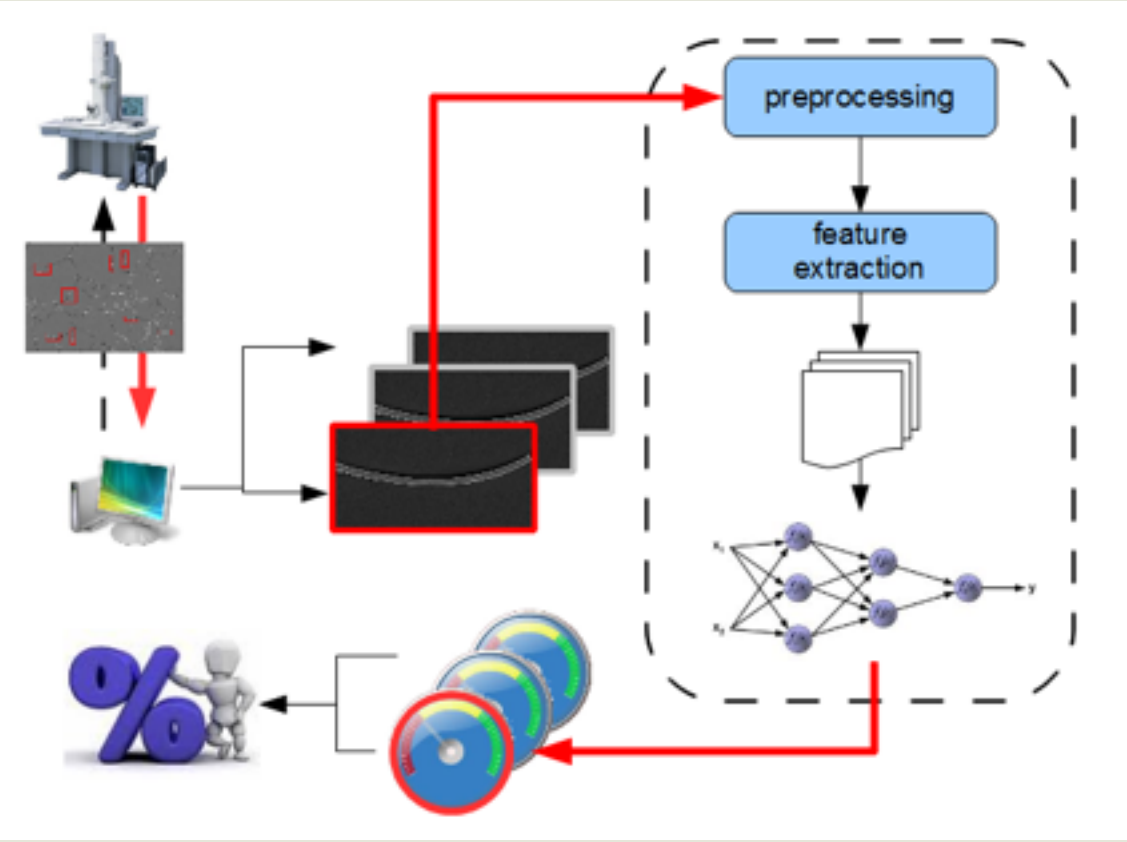


GAIA
Geometry and Algebra In Applications

CLASH project: a classifier for keratinic fibers



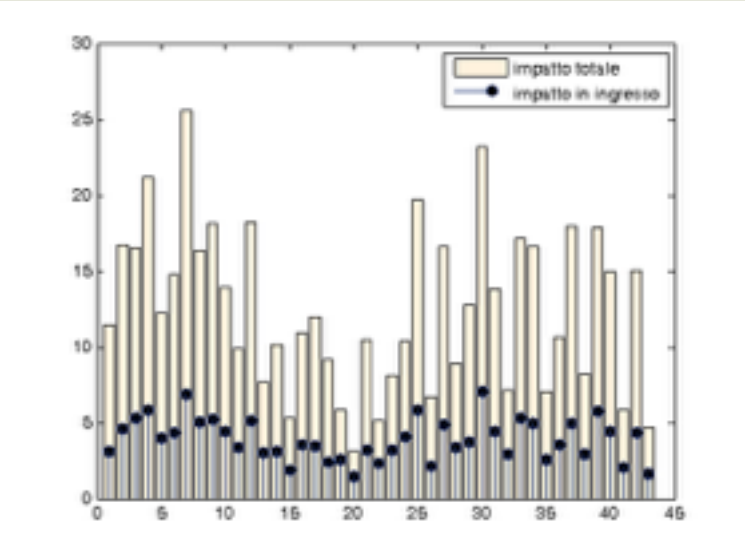
Deep Learning:

- use a cascade of many layers of nonlinear processing;
- unsupervised learning of multiple levels of features or representations of the data;
- learn multiple levels of representations that correspond to different levels of abstraction.

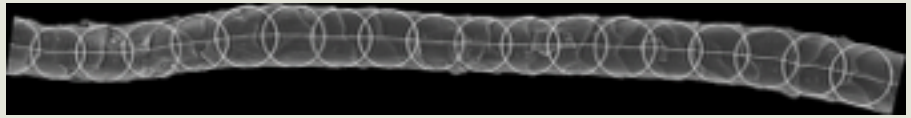
Neural Deep Learning:

- Multi layered networks
- Encoder / decoder networks
- Supervised NN helped by unsupervised NN

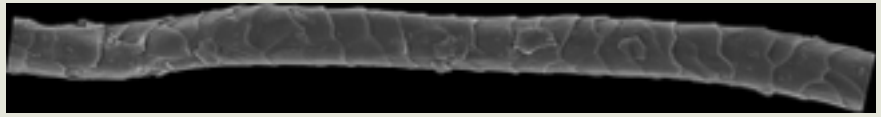
Extracted features:



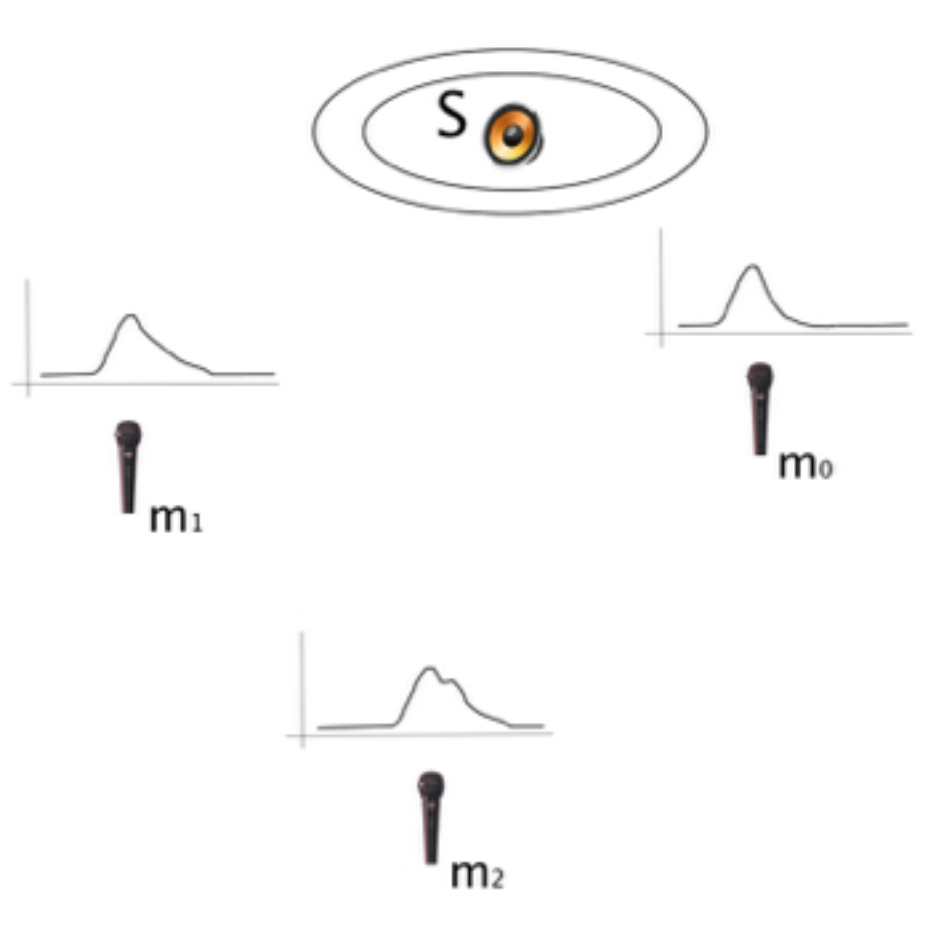
Processed images:



Raw image:

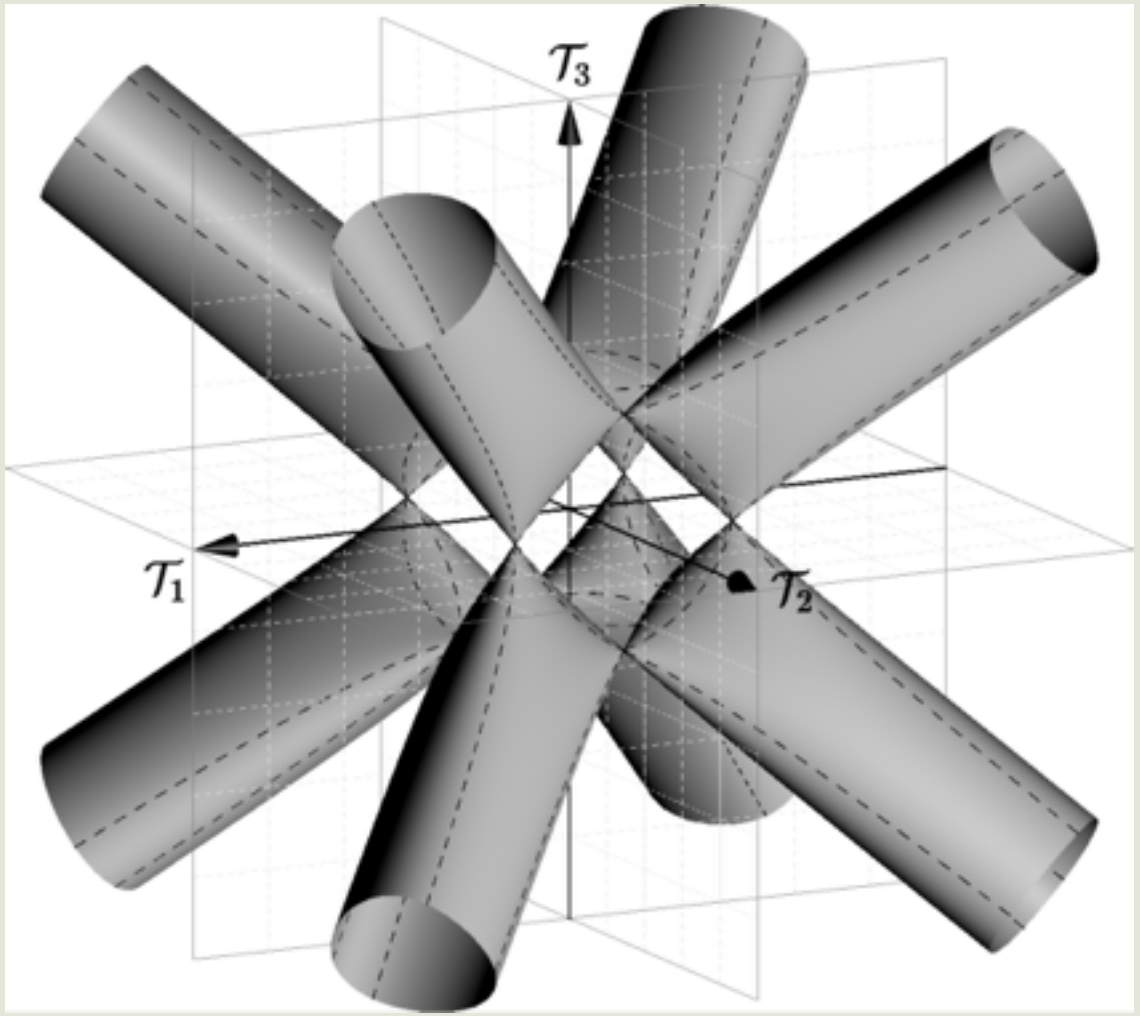


Geometry for Audio Signal Processing



Many problems in audio signal processing can be studied through a geometric approach. For example:

- sound source localization;
- microphone arrays calibration and synchronization;
- denoising and outlier removal from a dataset.



Many different approaches:

- differential geometry ⇨ information geometry;
- algebraic geometry ⇨ algebraic statistics;
- convex algebraic geometry ⇨ optimization problems.