

COMPANY

Pollen Metrology

RESEARCH CENTRE

Laboratoire Jean Kuntzmann & MaiMoSiNe

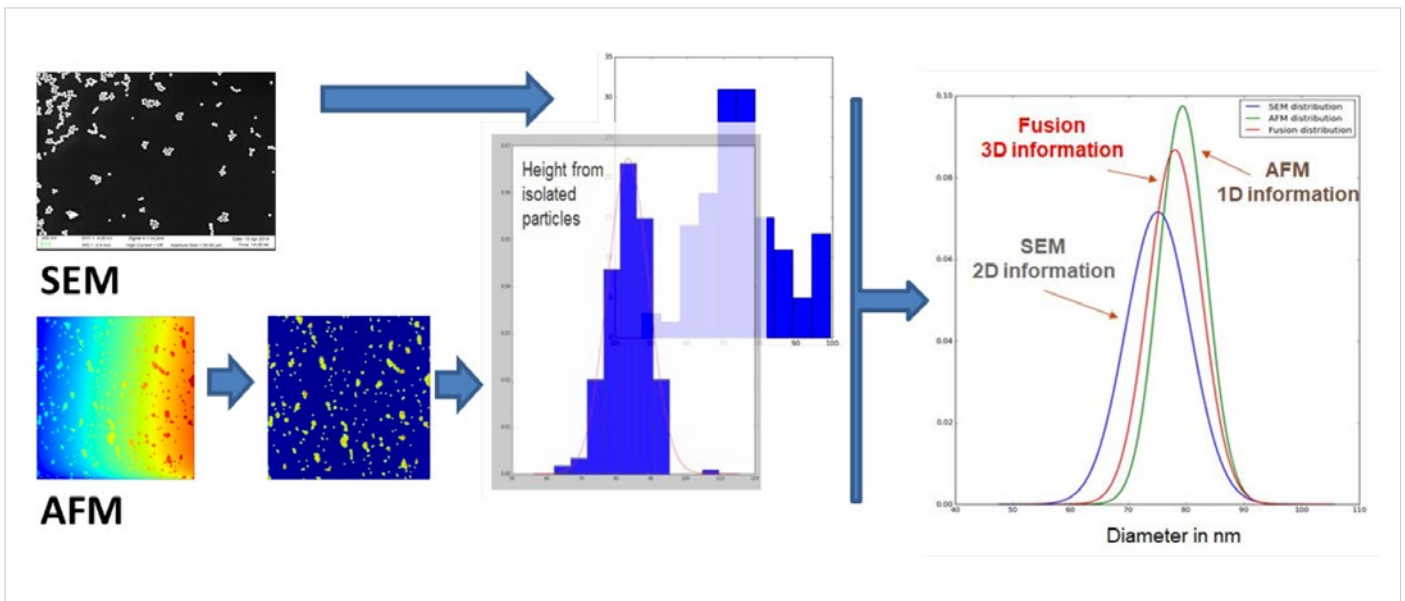
PRODUCTIVE SECTOR

Electronics

SS_017_2019

POLLEN

Pollen Metrology: Data fusion for Metrology.
Control and measurements of nanomaterials.



PROBLEM DESCRIPTION

By the 2000s, nanomaterial became industrial products, thus nanoproceses need to be (nano)mastered. This means working on high density images / huge amount of data in an efficient way, i.e automated reliable, consistent and fast analysis.

CHALLENGES AND GOALS

- ✓ Getting workable images.
- ✓ Image analyzing.
- ✓ Data fusionning to extract the best results.

The process has to be fully automated and configurable for the end-user (client).

MATHEMATICAL AND COMPUTATIONAL METHODS

We choose appropriate computational methods from a selection of images types (Scanning Electron Microscopy, Transmission Electron Microscopy, Atomic Force Microscopy). As a preliminary step for classification, regions of interest are detected using SVMs techniques (Support Vector Machines) and SIFT descriptors (Scale Invariant Feature Transform). The following step, analysis of AFM images of nanoparticles, has been conducted in partnership with LNE (National Laboratory of Metrology and Testing) and was the object of a PhD thesis with UK Laboratory. Finally, data fusion is applied by aggregating statistical estimators to obtain the wanted characteristics of the material.

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RESULTS AND BENEFITS

Robust algorithms for preprocessing (removing trends, segmentation and detection) have been adapted and mixed with innovative data fusion methods.

- ✓ 99.9% success on LNE data for automated particle analysis and 100% of success for automated AFM flattening.
- ✓ Automated Fusion by combining two estimators coming from multiple measurement techniques.



Accurate 3D process control.

For end-users:

Higher production yield.

Time reduction from week to minutes!

Pollen:

Taking over of market share.

Recognised as innovative.

