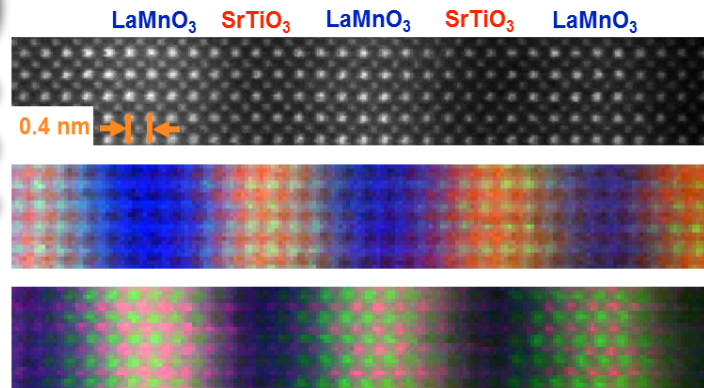
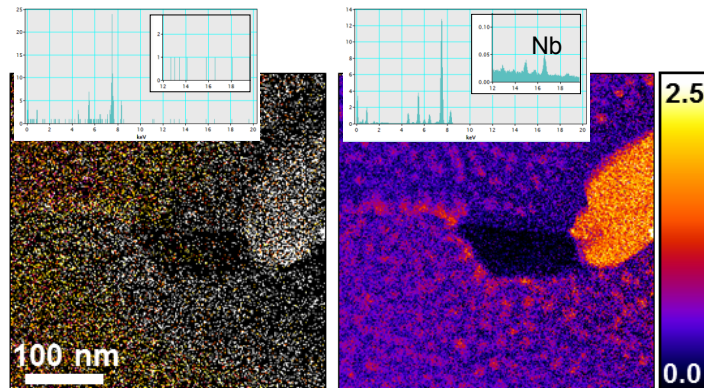


Multivariate Statistical Analysis

Advanced Manipulation Tools for Spectrum Images (SIs)



Color overlay elemental maps of SrTiO₃ (middle) and LaMnO₃ (bottom) extracted from atomic-column STEM-EELS SI of LaMnO₃/SrTiO₃ multilayer [3].



Raw (left) and MSA-reconstructed (right) Nb maps (16.6kV) and single pixel spectra in Ni-based superalloy [3].

MSA for Gatan DigitalMicrograph finds statistically significant features from 2D and 3D spectrum images gathered by spectrometric techniques such as XEDS, EELS, EFTEM and cathodoluminescence. This plug-in has originally been developed by Masashi Watanabe [1,2].

Key Features

- ◆ Automatically extracts statistically significant spectral features and corresponding spatial amplitudes as principal components (see left top figure)
- ◆ Performs efficient noise reduction on SIs
- ◆ Enhances weak signals hidden under noise in SIs (see left bottom figure)
- ◆ Includes utilities to import line profiles and SIs obtained by acquisition systems other than DigitalMicrograph (Gatan).

- References:** [1] M. Watanabe, D.B. Williams and M.G. Burke, Atomic-Level Analytical Electron Microscopy of Diffusional Phase, in Proc. Inter. Conf. on Solid-Solid Phase Transformations in Inorganic Materials 2005 - Vol. 2, pp. 431-442 (2005).
 [2] M. Watanabe, E. Okunishi and K. Ishizuka, Analysis of Spectrum-Imaging Datasets in Atomic-Resolution Electron Microscopy, Microscopy and Analysis, 23 Nov. (2009) 5-7.
 [3] M. Watanabe, Microscopy Hacks: Development of various techniques to assist quantitative nanoanalysis and advanced electron microscopy, Microscopy, 62 (2013) 217-241.