



Webinar Q&A Report: Enabling Artificial Intelligence for Future (S)TEM Applications

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Is the capability to mask/map nanoparticles built into any of the commercially available software?

Yes: APW (Automated NanoParticle Workflow)

How much of what you are doing here works with open-source tools (e.g., python libraries) and do you write your data into easy-to-read open data formats (e.g., hdf5, hspy)?

AutoScript is just the API, it accesses the microscope. The scripting environment is the open-source Python editor and offers any data format.

Can AI be used for analyzing TEM diffraction patterns?

AI only does what it's been trained to do, so the answer depends on what is meant by "analysing". We're far away from determining structures without any other input but training neural networks to detect 2nd phase precipitation in alloys for instance is well within reach.

What's the difference between the two scripting scenarios, local and remote? Which one is preferred?

From a user perspective there's no real difference: locally you work directly at the microscope and remotely it can be any PC that's connected to the microscope usually via a support PC. I guess local operation is preferred when testing functionality.

Is it also possible to automate the microscope with AutoScript?

AutoScript is the automation API, its purpose is to automate the microscope. In that sense it's only the enabler of AI.

Can AutoScript record the separate signals from the different segments of the STEM detectors separately?

Yes, it does. As an example, iDPC imaging can be done via AutoScript.

In slide 23 you show a very nice example of improving spatial resolution via AI on a STEM image, but you also mention that it can be used to denoise images, is it something that can be used as a low-dose image acquisition approach?

Yes, if you carefully train the system to look for atoms it'll find the atom column locations just like your brain does, but the neural network will do a better job at finding all the columns in the noise and then it's just a matter of visualizing those findings in a more pleasing de-noised way.

Contact Information

If you have additional questions for [Thermo Fisher Scientific](https://www.thermofisher.com/ca/en/home/materials-science.html#em-contact-form) regarding content from their webinar or wish to receive additional information about their products and services, please contact them at:
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