

# Release notes

# PerGeos Software

# Version 2019.3

## DIGITAL ROCK VISUALIZATION, ANALYSIS AND SIMULATION

The aim of this document is to inform you about the most important new features, improvements and changes in this version of Thermo Scientific™ PerGeos Software.

Please read these Release Notes carefully.

We would appreciate your feedback regarding this version. If you encounter any problems or have any suggestions for improvement, please do not hesitate to contact us at [FRBOR.3d\\_hotline@thermofisher.com](mailto:FRBOR.3d_hotline@thermofisher.com).

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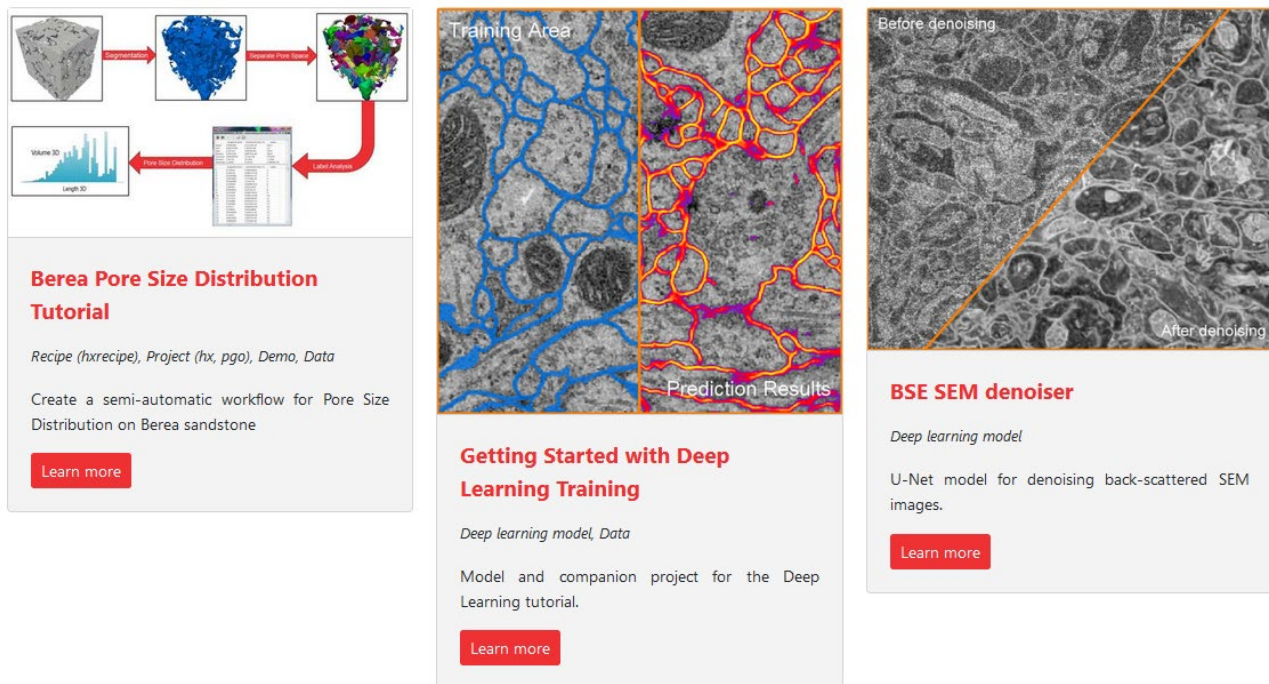
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## The new Xtra Library website

With the 2019.3 release, a new website is available for sharing a collection of add-ons (recipes, scripts, demos. ...and more) that will help improve day-to-day use of Amira-Avizo Software and gain both time and efficiency. The website is accessible at <https://xtras.amira-avizo.com/>.

The website will be extended with use cases on a regular basis, independent of the release cycle of the products.



**Berea Pore Size Distribution Tutorial**  
Recipe (hxrecipe), Project (hx, pgo), Demo, Data  
Create a semi-automatic workflow for Pore Size Distribution on Berea sandstone  
[Learn more](#)

**Getting Started with Deep Learning Training**  
Deep learning model, Data  
Model and companion project for the Deep Learning tutorial.  
[Learn more](#)

**BSE SEM denoiser**  
Deep learning model  
U-Net model for denoising back-scattered SEM images.  
[Learn more](#)

## General Enhancements and new features

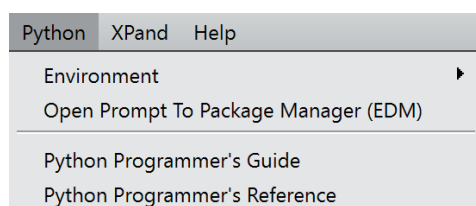
### Python

This version introduces significant improvements that enable better management of Python environment creation for PerGeos and also enable setup of environments with Deep Learning support.

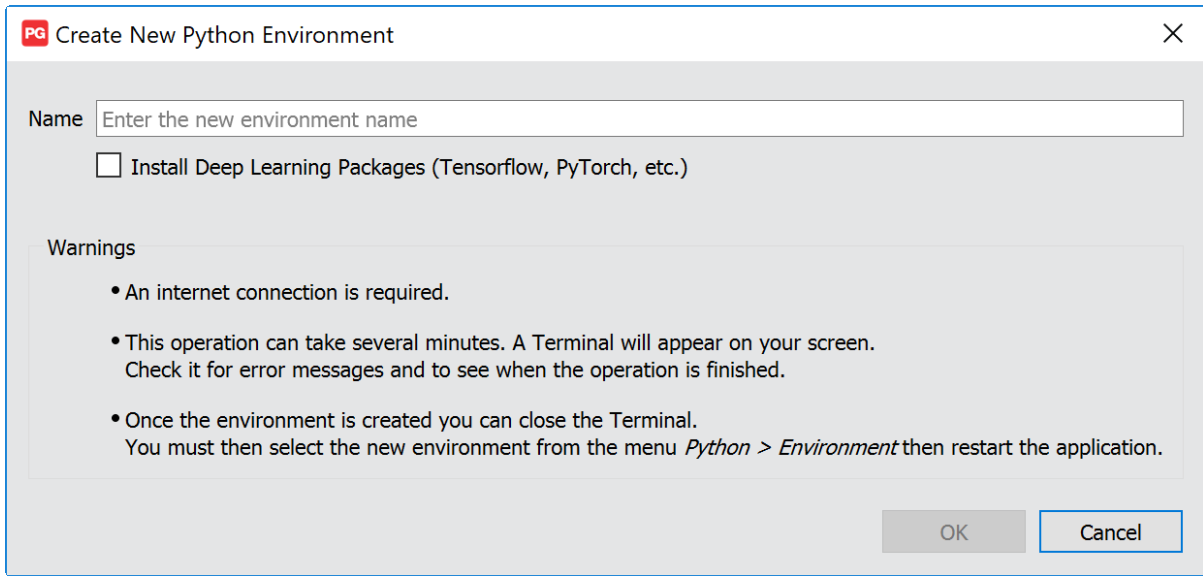
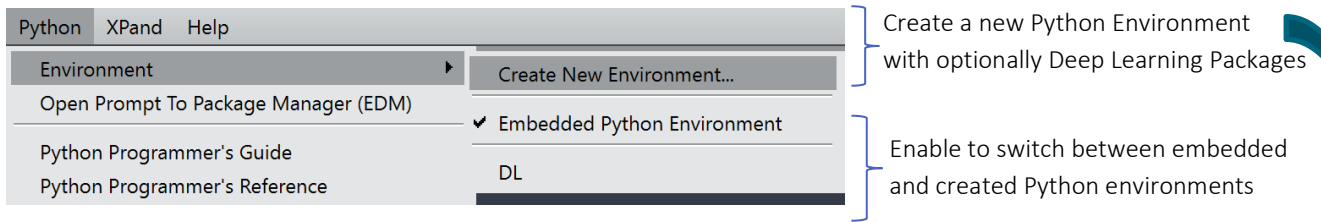
These improvements are listed below:

- New Python Menu in the main toolbar to access:
  - Python Environments
  - Enthought Deployment Manager (EDM\*)
  - Python documentation

\* EDM creates self-contained environments with their own set of executable Python packages. This allows users to reproduce a colleague or partner's environment for co-development, troubleshooting, testing, or to work on different projects with different sets of dependencies.



- Add the capability to create a new Python environment that PerGeos Software will use for scripting



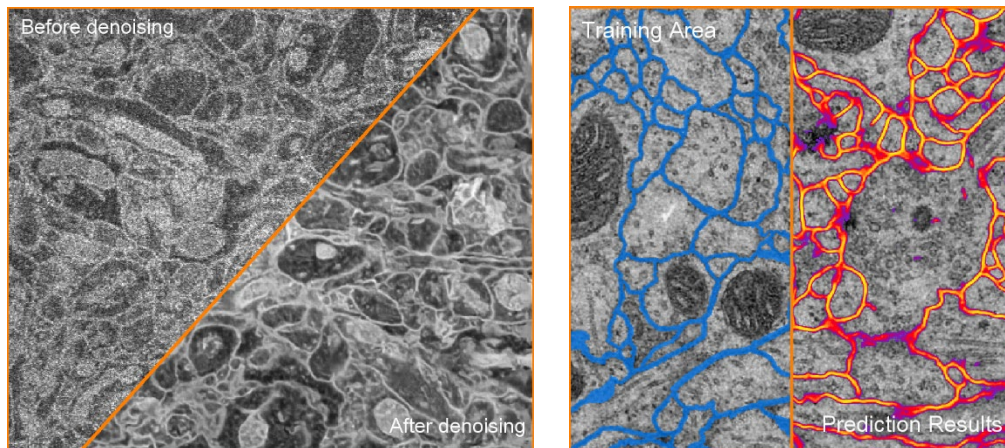
- New ready-to-use Python bundle with Deep Learning packages
  - Most common Deep Learning packages are accessible:
    - Keras
    - TensorBoard
    - TensorFlow-GPU
    - PyTorch
  - Environment packages are downloaded at the Python environment creation from the Enthought download center
  - No need to install CUDA SDK
  - Deep Learning packages only available on Windows for now
- The port on/off (HxPortOnOff) and the progress bar (HxProgress) are now wrapped in Python.

## Deep Learning

This version introduces Deep Learning into PerGeos Software, through two new modules and a tutorial explaining and illustrating their usage. Both modules rely on the new python environment and the Deep Learning packages and are thus available only on Windows. A GPU supporting CUDA Compute 3.5 is also required.

The *Deep Learning Training* module allows training a model for binary segmentation, given a grayscale image and its corresponding segmentation; and the *Deep Learning Prediction* module allows applying a trained model to process a grayscale image.

Resource datasets and examples of trained models for the tutorial are available for download from the new Xtras library: <http://xtras.pergeos.com/>. For now, only life sciences samples are provided.



*Left:* Illustration of the example Deep Learning model provided for back-scattered image denoising. *Right:* Membranes segmentation using Deep Learning – data courtesy of A. Cardona\*

\* Cardona A, et al. 2010. An Integrated Micro- and Macroarchitectural Analysis of the Drosophila Brain by Computer-Assisted Serial Section Electron Microscopy. *PLoS Biol* 8(10): e1000502. doi:10.1371/journal.pbio.1000502.

## Structure Enhancement Filter

This new filter enables enhancement of structures such as balls (dots, pores, spherical cells), rods (throats) and planes (cracks), relying on either the eigenvalue analysis of the Hessian or the Structure Tensor. The filter can operate at a range of scales and is thus able to highlight structures of different sizes.

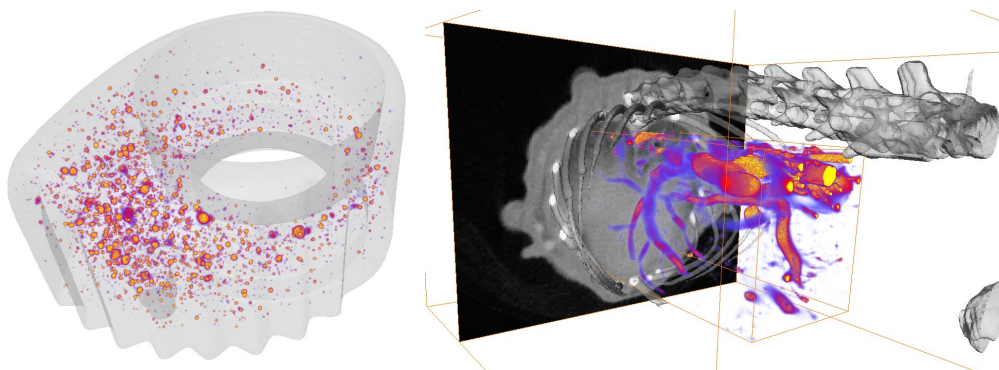


Illustration of Structure Enhancement Filter. *Left:* highlighting pores of varied sizes in aluminium cast. *Right:* highlighting blood vessels in small animal  $\mu$ CT.

## Future deprecations

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This section documents the features that will be deprecated or removed from the next PerGeos Software version.

- This version is the last version to support Windows 7 since Microsoft has announced the end of support of this version the 14<sup>th</sup> January 2020 (see <https://www.microsoft.com/en-us/microsoft-365/windows/end-of-windows-7-support> for details).

If you continue to use PerGeos on Windows 7 after support has ended, it should still work, but will no longer provide technical support and software update.

## Operating systems

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PerGeos Software version 2019.3 runs on:

- Microsoft Windows 7/8/10 (64-bit)
- Linux x86 64 (64-bit). Supported 64-bit architecture is Intel64/AMD64 architecture. Supported Linux distribution is Red Hat Enterprise Linux 7.

To add custom extensions with PerGeos XPand extension, you will need:

- Microsoft Visual Studio 2013 (VC12) Update 4 on Windows
- gcc 4.8.x on Red Hat Enterprise Linux 7

## Solved issues

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<b>Camera Path</b>	AA-15264	A smooth option has been added to the Camera Path module. If the camera turns unexpectedly during an animation, it is now possible to smooth its trajectory.
<b>Heterogeneity Logs</b>	AA-21300	Heterogeneity Logs could generate null logs; this has been fixed.
<b>Label Analysis</b>	AA-8168	Precision could be lost when Label Analysis results were converted or exported to a spreadsheet. This has been fixed.
<b>LDA</b>	AA-21183	Saving a project containing an LDA data in pack&go mode could generate an error. LDA files are now correctly saved.
<b>Movie Maker</b>	AA-20363 AA-21354 AA-17898 AA-20911	Exporting a movie from the Animation Director is now stable with large data.
<b>Save</b>	AA-15001	A warning will now pop up when saving a project / data with special characters which are not supported in its name and / or path.
<b>Snapshot</b>	AA-21277	Snapshot tool width and height parameters are now automatically set by default to the viewer dimension.
<b>Viewers</b>	AA-13254	It is now possible to link the cameras of multiple viewers to one single viewer.

We are focused on solving as many issues as possible to make your experience with PerGeos Software as satisfactory as possible. We would appreciate your feedback regarding this version. If you encounter problems, or if you have suggestions for improvements, please report them to [FRBOR.3d\\_hotline@thermofisher.com](mailto:FRBOR.3d_hotline@thermofisher.com).