

PerGeos Software version 2023.2

Release notes

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Introduction

This document covers the most important new features, improvements, and changes in this version of Thermo Scientific™ PerGeos™ Software. In addition, you will find a list of new Xtras including video tutorials, recipes, and workflows which have been published in the **Xtras Library** since the previous release.

Visit our **Customer Support and Service Center** to access services and resources that help you make the best use of your product.

We value your feedback. If you encounter any problems or have any suggestions for improvement, do not hesitate to **contact us**.

Deep Learning Denoising

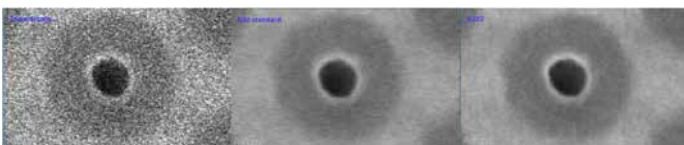
Noise2Void version 2 (N2V2)

Denoising tools help you run faster acquisitions and digitally preserve image quality and signal-to-noise ratio.

The Noise2Void approach is an unsupervised denoising method that does not require noisy image pairs or clean target images. Therefore, a model can be directly trained with this method using the images you need to denoise without a ground truth. Previously, a module named *DL Training - Noise to Void 2D* was introduced to train a model using this pipeline. However, this method was known to produce visible checkerboard artifacts. A new version, N2V2, has been proposed that significantly reduces such artifacts, as written in doi: [10.48550/arXiv.2211.08512](https://doi.org/10.48550/arXiv.2211.08512). In this version of PerGeos Software, *DL Training - Noise to Void 2D* is updated to train with the N2V2 models.



SEM image of a diatom acquired with a Thermo Scientific™ Phenom™ XL Desktop SEM.



SEM image detail from a 3D NAND sample, acquired with a Thermo Scientific™ Helios™ 5 PXL Wafer DualBeam™ System, at a resolution of 1.22 nm per pixel. A short dwell time is used to prioritize acquisition throughput over signal-to-noise ratio. Left) raw image; middle) image denoised using the original N2V model; right) image denoised using the new N2V2 model, trained in the same conditions as the N2V image.

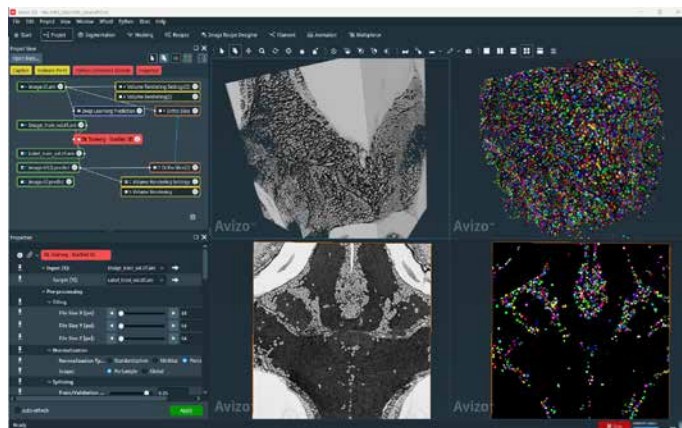
OS requirements: Windows only

Other requirements:

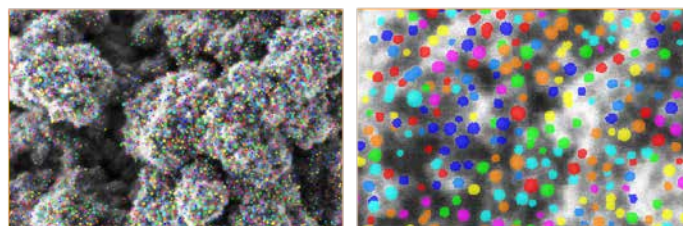
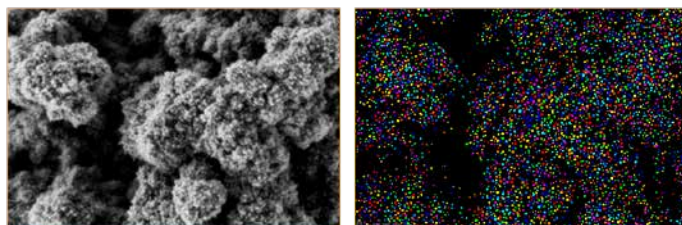
An NVIDIA GPU supporting CUDA Compute Capability 5.2 or higher, with up-to-date drivers. Your CPU must support the AVX2 extensions. The Python environment for deep learning has been upgraded; please remember to install it prior to using the new tools.

StarDist 2D and 3D modules

StarDist represents a well-established and highly efficient deep learning method for instance segmentation of convex objects such as cells. In this version, we introduce two distinct training modules tailored for the development of such models, namely “DL Training Stardist 2D” and “DL Training Stardist 3D.” To facilitate the training process, a gray-level dataset, coupled with the corresponding ground truth (annotated) data, are required. Once a model has been effectively trained, it can be used within the “Deep Learning Prediction” inference module for accurate object segmentation and separation.



Zebrafish neuronal nuclei segmentation in an SEM image using the StarDist 3D method. The data is available from <https://nucmm.grand-challenge.org/>.



Pt/Pd catalyst nanoparticles on carbon, acquired with a Thermo Scientific™ Apreo™ SEM. Data analyzed with 2D StartDist segmentation training and prediction.

OS requirements: Windows only

Other requirements:

An NVIDIA GPU supporting CUDA Compute Capability 5.2 or higher, with up-to-date drivers. Your CPU must support AVX2 extensions. The Python environment for deep learning has been upgraded; please remember to install it prior to using the new tools.

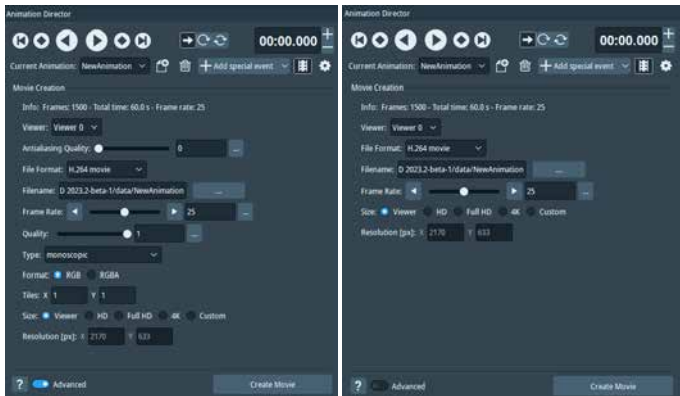
Animation Director improvements

The Animation Director is now able to generate higher quality movies while minimizing file size, thanks to efficient codecs that are directly readable with Windows Media Player, Microsoft PowerPoint, etc.

The new default is now H.264, which yields high quality and compression. The AV1 codec offers the highest compression rate but is slower and is not supported by all movie players. The VP9 codec has intermediate performances between H.264 and AV1 and remains widely readable.

The movie creation interface has also been simplified to show only the most relevant parameters; an advanced mode is available to access less frequently used functionalities such as anti-aliasing rate or stereoscopic modes.

OS requirements: All supported platforms



The interface for the Animation Director movie creation panel is simplified, and now allows for advanced codecs to be selected. Additional advanced options can be enabled with the bottom toggle.

Compatibility notes

Transparency Nodes

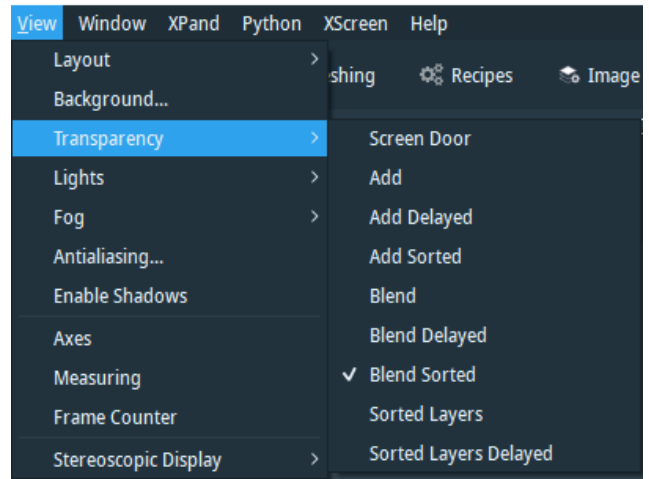
The options for transparencies have been simplified and renamed. Available transparencies are:

- Opaque First (default) – previously named Blend Delayed
- Sorted Object – previously named Blend Sorted
- Sorted Pixel – previously named Sorted Layers Delayed

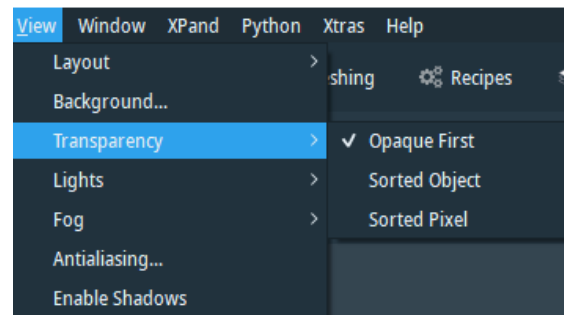
Deprecated transparency modes remain accessible for compatibility with TCL script commands, using the TCL command:

```
viewer [<number>] setTransparencyType <type>.
```

The previous type numbers can still be called; they will, however, be removed in future versions.



Previous transparency options.



New transparency options.

End of Support

OpenGL 2.1 support

PerGeos Software now requires, at a minimum, OpenGL 4.2, instead of 2.1 as in previous versions.

XPand extension requirements

To add custom C++ extensions to Amira and Avizo Software (Advanced Packages), you will need:

- Microsoft Visual Studio 2019 version 16.2 (v142) on Windows
- gcc 9.x on Linux Ubuntu 20.04

Operating systems

PerGeos Software version 2023.2 runs on:

- Microsoft Windows 10 (64-bit).
- Microsoft Windows 11 (64-bit)
- Linux x86 64 (64-bit) running on Intel64/AMD64 architecture and Ubuntu 20.04 (desktop)

Our products are tested on the following configurations:

Platform	GPU	Driver number
Windows 10	NVidia Tesla T4	537.13
Windows 11	NVidia RTX A4500	537.34
Ubuntu-20.04	NVidia T1000	535.113.01

Resolved issues

Name	ID	Description
Viewer gadgets in snapshots and animations	AA-29120	Compass and trackball are now shown in snapshots and animations if visible in the viewer.
Colormap legend background size	AA-27809	Colormap legend background size is no longer larger than necessary.
FFT Filter	AA-28891	It is now possible to use the FFT Filter on 8-bit signed data.
STL Reader	AA-28819 AA-28769 AA-28582	STL Reader has been improved to allow for the loading of big data.
Interpolate	AA-28649	Interpolation no longer leaves occasional holes in the YZ direction.
Resample	AA-28586	Resampling data with the box filter has been fixed in order to avoid failure when input size is not divisible by the voxel size ratio.
Flow Simulation View	AA-28288	Isolated pores are now highlighted with a different color, so that they can be visible during the simulation.

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