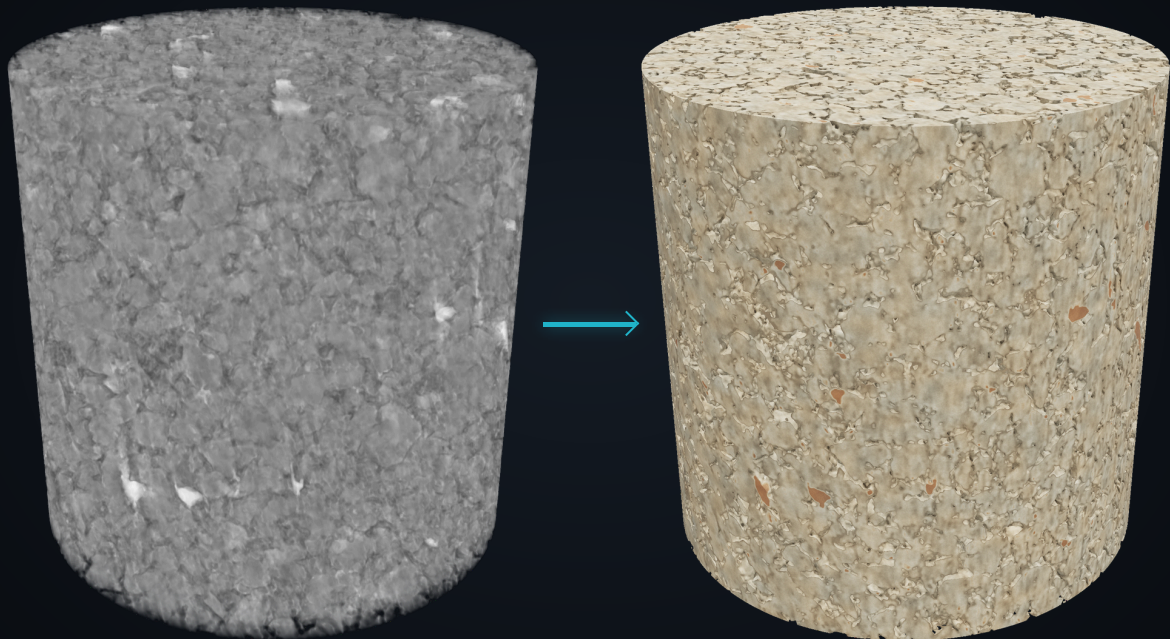




MICRO-CT DENOISING AND 3D FOR RESERVOIR ROCK

See the reservoir. Not the noise.

AI denoising, a full-resolution 3D viewer, petrophysics, training and batch for micro-CT scans of core samples, in one desktop application.



X-RAY VOLUME

ROCK SURFACE

+8.4 dB
IMAGE QUALITY

4.7x
SHARPER BOUNDARIES

1.6 %
POROSITY ERROR

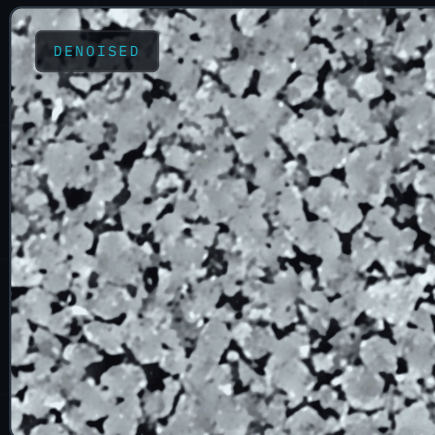
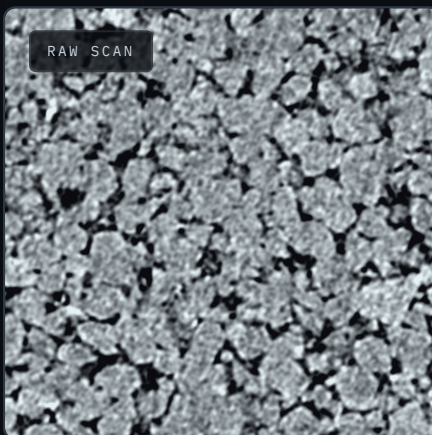
3.4 bn
VOXELS IN ONE SCAN



MEASURED, NOT CLAIMED

Noise changes the answer. We bring it back.

Every result below comes from sandstones the model never saw during training, compared against the published clean reference scan.



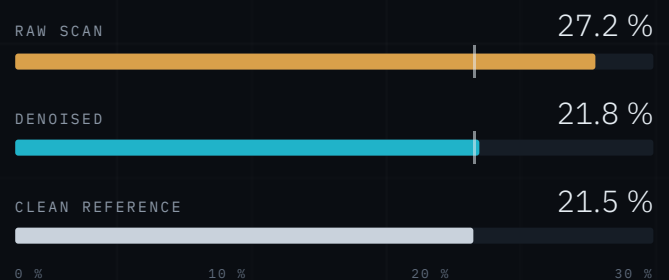
KIRBY SANDSTONE, AXIAL SLICE 500, 1.35 mm FIELD OF VIEW

METRIC	RAW	DENOISED	GAIN
KIRBY SANDSTONE			
PSNR (dB)	24.97	33.36	+8.39
SSIM	0.753	0.978	+0.224
Edge error	0.177	0.038	4.7x
LEOPARD SANDSTONE			
PSNR (dB)	21.06	27.57	+6.51
SSIM	0.607	0.905	+0.298
Edge error	0.259	0.070	3.7x

Full-volume metrics over 996 slices per sample, each volume percentile-normalised. Lower edge error means grain boundaries are kept sharp, not blurred.

Noise inflates porosity. Porosity drives oil in place.

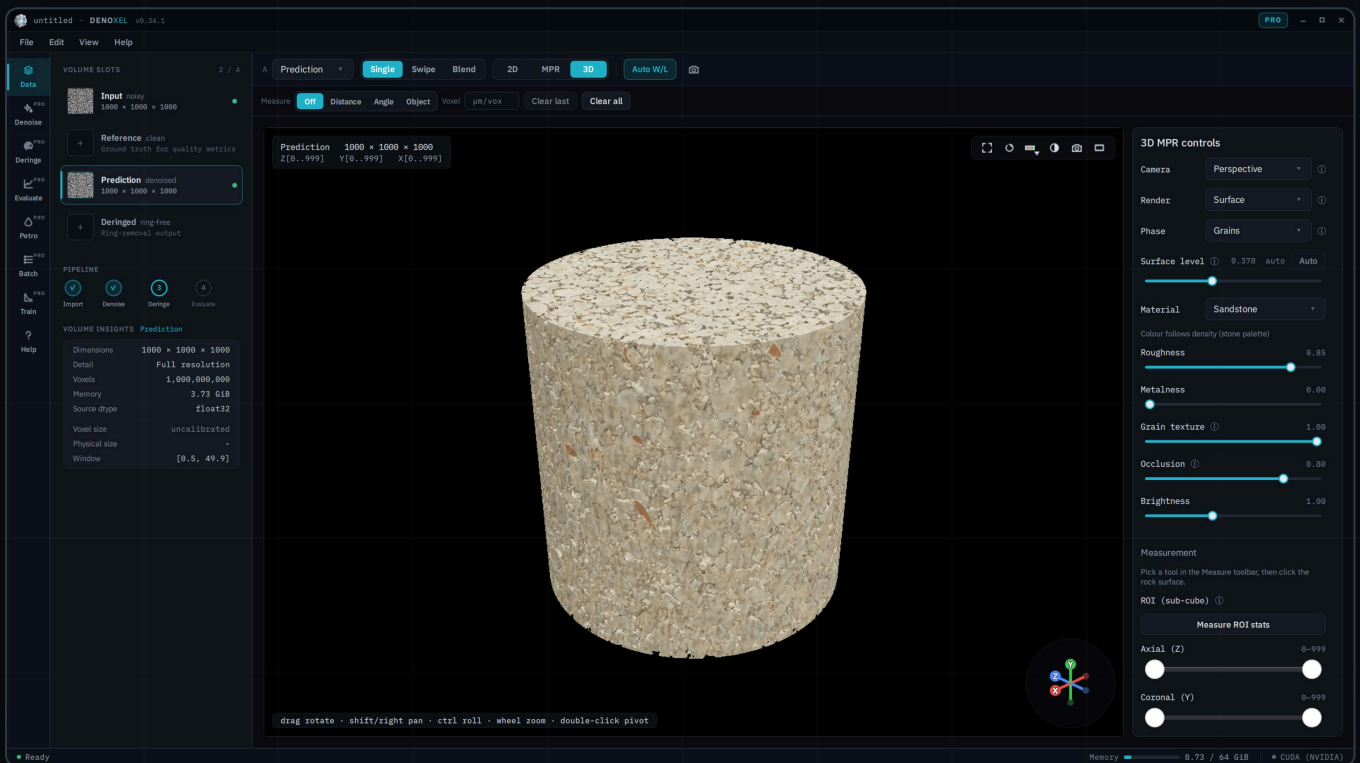
Dark speckle is segmented as pore space. The denoised scan reproduces the porosity of the clean reference.



FULL-RESOLUTION 3D VIEWER

Every grain. In 3D.

Open a billion-voxel scan and turn it in real time. Cut into it, clip it at any angle, cast the pore space solid, and measure on the surface you see.



KIRBY SANDSTONE CORE PLUG, 1,000,000,000 VOXELS AT FULL RESOLUTION, DENOISED BY DENOXEL



- 01**
Full resolution
 A billion-voxel scan on one GPU, no downsampling. Larger scans are fitted to the GPU memory automatically.
- 02**
Core plug view
 Clip the scan to a cylinder, the shape of a drilled core plug.
- 03**
Crop, clip, pore cast
 Look inside at any plane, or flip to the pore network as a solid.
- 04**
Measure in 3D
 Distance, angle and objects picked on the rendered surface.



SURFACE MATERIALS

Stone, ceramic or metal.

One scan, five finishes. Stone presets colour every grain by its measured density; ceramic and metal show the pure shape of the rock.



REAL PRE-SALT CARBONATE

3.4 billion voxels. One workstation.

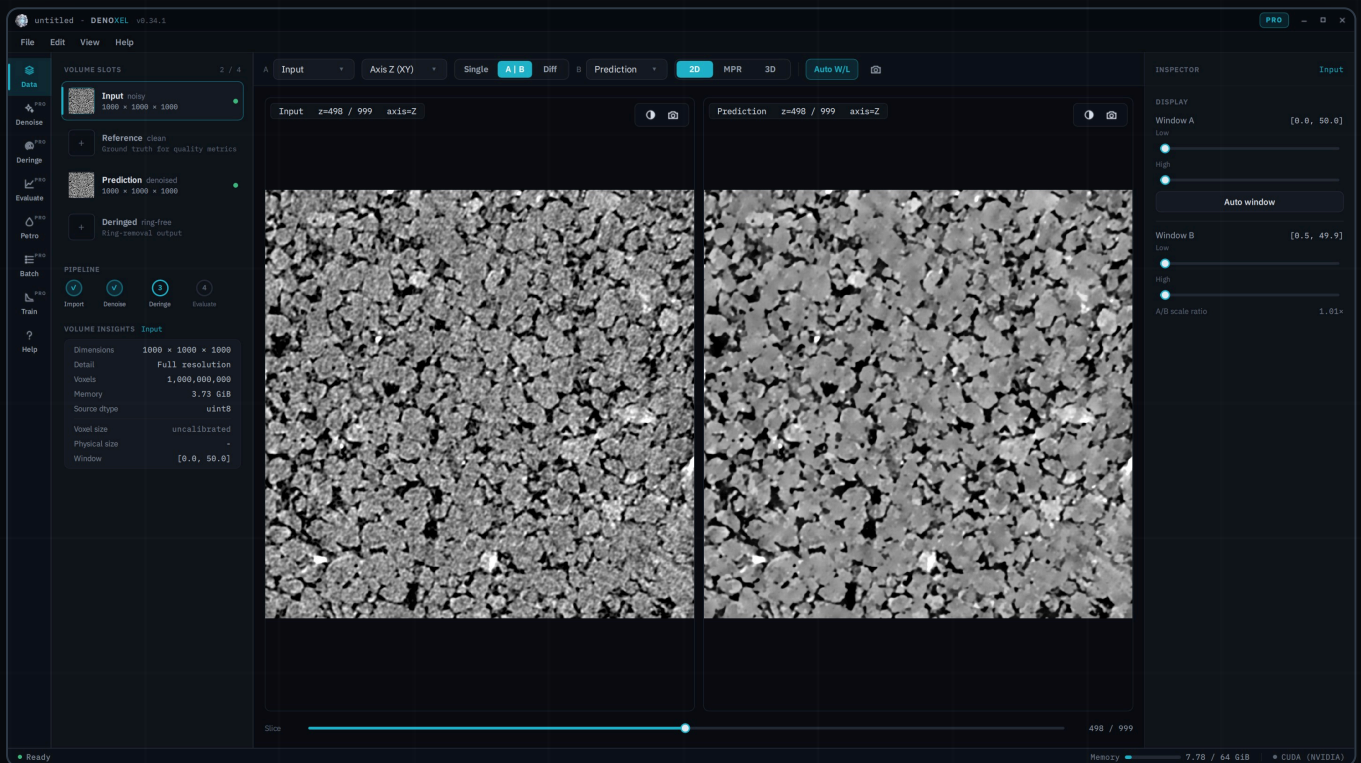
Digital Rocks Portal DRP-503, 1401 x 1461 x 1655 voxels at 8 μ m, opened on one workstation. Its pore network cast as a solid, and the same scan as an X-ray volume and a Carbonate surface.



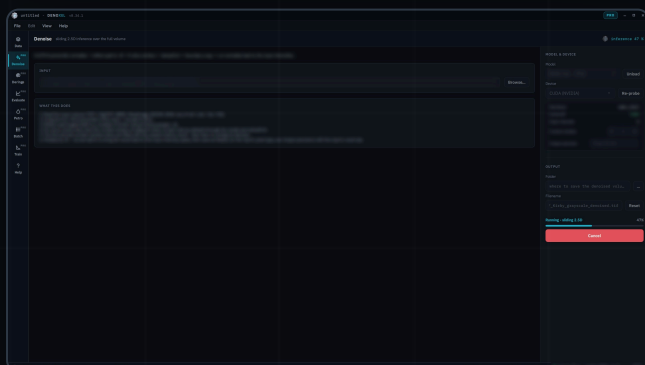
NEURAL DENOISING

Noise out. Grains in.

A 2.5D network trained on reservoir rock removes acquisition noise and keeps grain boundaries sharp. Compare the raw and denoised scan side by side, slice by slice.



RAW SCAN (LEFT) AND DENOXEL (RIGHT), THE SAME SLICE OF KIRBY SANDSTONE, LINKED



DENOISING THE FULL VOLUME, LIVE PROGRESS

13 min for a full 1000³ volume, one billion voxels, on one RTX 4080, loading and saving included

Runs on NVIDIA GPUs with CUDA or on the CPU, fully offline. Output keeps full float32 precision and the voxel size of the input.

01

Built-in models

Trained on sandstones, ready to run on your first scan.

02

Proof on every run

PSNR, SSIM and edge error against a reference, per slice.

03

Any scanner

TIFF, DICOM, NRRD, MetaImage and RAW, 8 to 32 bit.

04

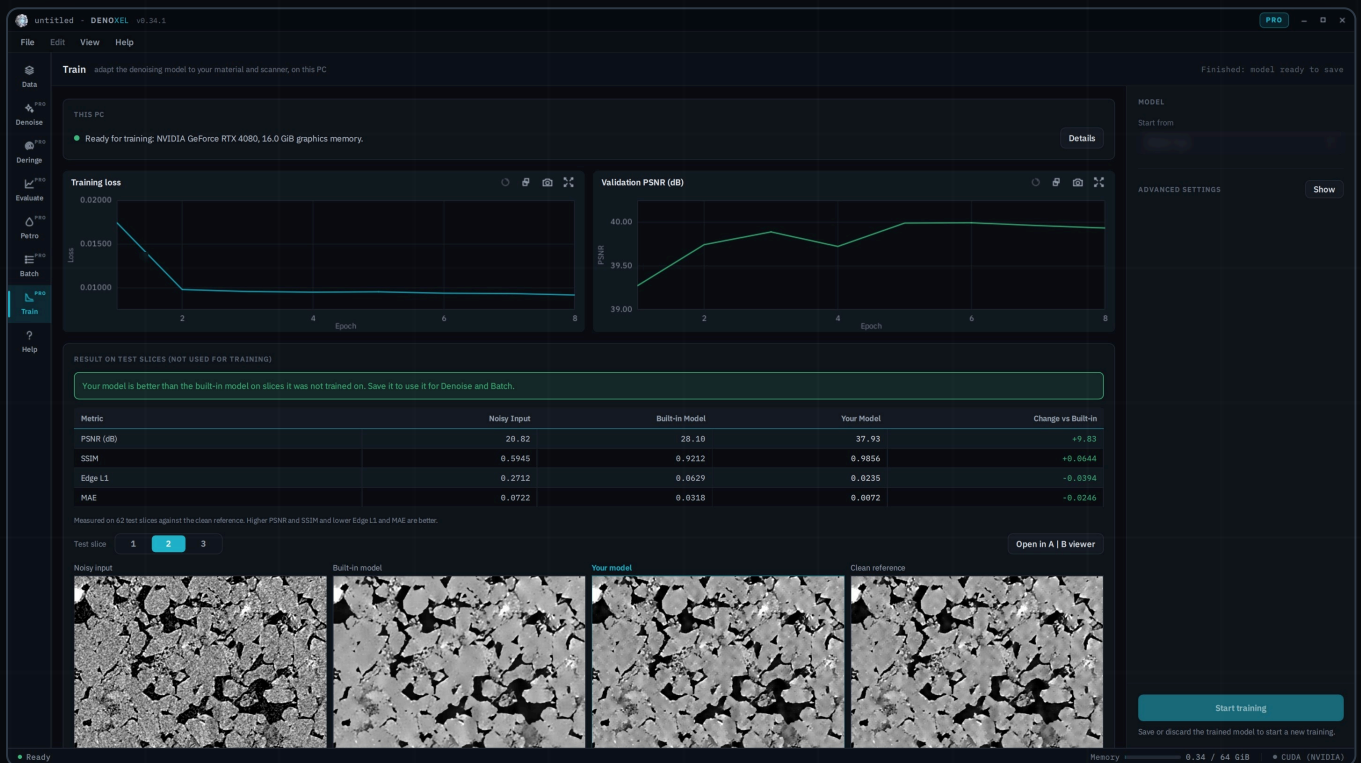
Private by design

No cloud. Scans never leave the workstation.

ON-DEVICE TRAINING

Teach it your rock. On your own GPU.

Every scanner and every rock is different. Train the model on your own noisy and clean scans, on this PC, and see before you save it whether it beats the built-in model.



FINISHED TRAINING RUN WITH ITS RESULT ON TEST SLICES IT NEVER TRAINED ON

METRIC	NOISY	BUILT-IN	TRAINED	CHANGE
PSNR (dB)	20.82	28.10	37.93	+9.83
SSIM	0.5945	0.9212	0.9856	+0.0644
Edge L1	0.2712	0.0629	0.0235	-0.0394
MAE	0.0722	0.0318	0.0072	-0.0246

Leopard sandstone, 8 epochs, about 4 minutes on one RTX 4080. Measured on 62 test slices that were not used for training.

+9.8 dB over the built-in model, after 4 minutes

Loss and validation PSNR are charted live while it trains; you can pause or stop it at any time.

01

Your data stays here

Training runs locally. Nothing is uploaded.

02

Checks the PC first

Graphics card, driver, memory and disk, before you start.

03

Proof before saving

Your model against the built-in one, on held-back slices.

04

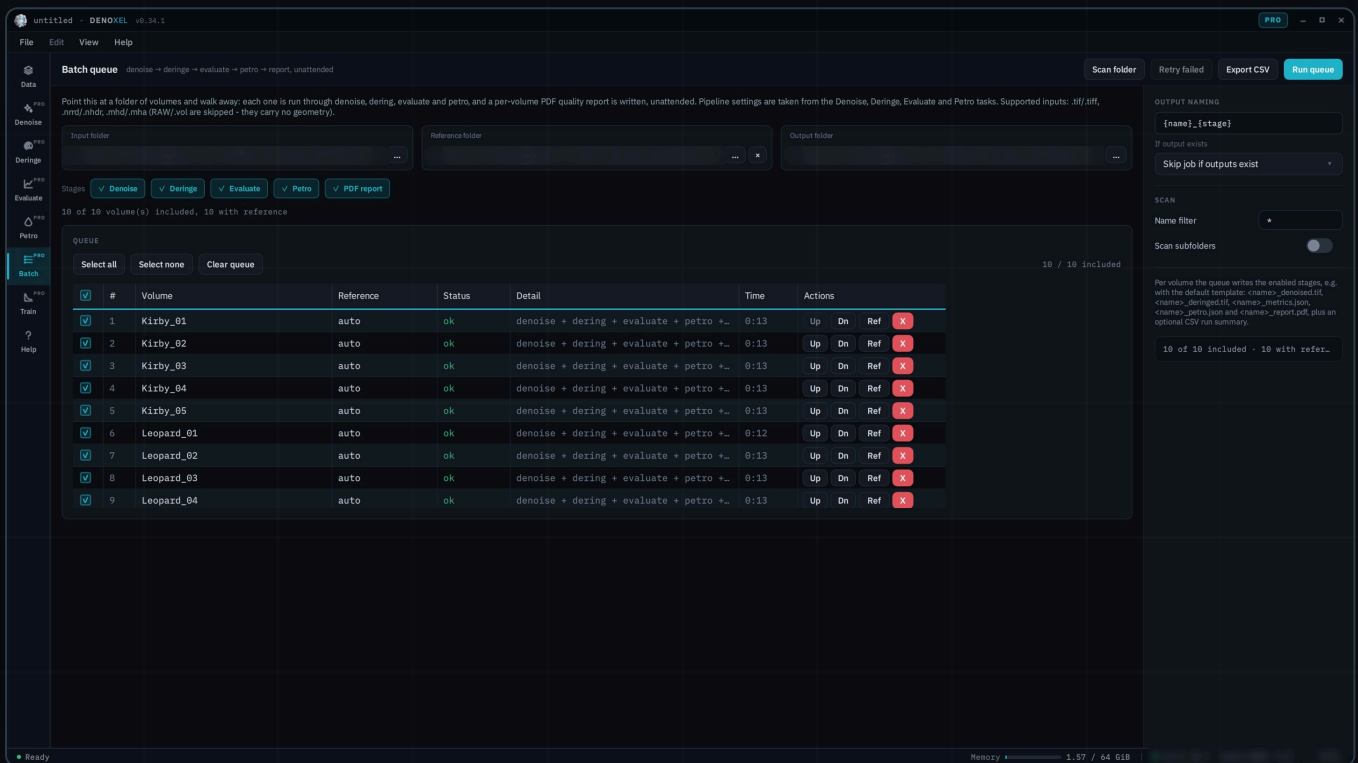
Use it everywhere

Saved models appear in Denoise and in Batch.

UNATTENDED BATCH

Queue every scan. Walk away.

Point it at a folder. Every scan is denoised, evaluated against its reference, measured and reported, one after another, while you do something else.



Batch queue denoise → derings → evaluate → petro → report, unattended

Point this at a folder of volumes and walk away: each one is run through denoise, dering, evaluate and petro, and a per-volume PDF quality report is written, unattended. Pipeline settings are taken from the Denoise, Derings, Evaluate and Petro tasks. Supported inputs: .tif/.diff, .nrrd/.nhdr, .mhd/.mha (RAW) (vol are skipped - they carry no geometry).

Input folder: ... Reference folder: ... Output folder: ...

Stages: ☒ Denoise ☒ Derings ☒ Evaluate ☒ Petro ☒ PDF report

10 of 10 volume(s) included, 10 with reference

Select all	Select none	Clear queue		#	Volume	Reference	Status	Detail	Time	Actions
☒			1	Kirby_01	auto	ok	denoise + dering + evaluate + petro + ...	0:13	Up Dn Ref X	
☒			2	Kirby_02	auto	ok	denoise + dering + evaluate + petro + ...	0:13	Up Dn Ref X	
☒			3	Kirby_03	auto	ok	denoise + dering + evaluate + petro + ...	0:13	Up Dn Ref X	
☒			4	Kirby_04	auto	ok	denoise + dering + evaluate + petro + ...	0:13	Up Dn Ref X	
☒			5	Kirby_05	auto	ok	denoise + dering + evaluate + petro + ...	0:13	Up Dn Ref X	
☒			6	Leopard_01	auto	ok	denoise + dering + evaluate + petro + ...	0:12	Up Dn Ref X	
☒			7	Leopard_02	auto	ok	denoise + dering + evaluate + petro + ...	0:13	Up Dn Ref X	
☒			8	Leopard_03	auto	ok	denoise + dering + evaluate + petro + ...	0:13	Up Dn Ref X	
☒			9	Leopard_04	auto	ok	denoise + dering + evaluate + petro + ...	0:13	Up Dn Ref X	

10 / 10 included

OUTPUT NAMING

{name}_{stage}

If output exists

Skip job if outputs exist

SCAN

Name filter

Scan subfolders

Per volume the queue writes the enabled stages, e.g. with the default template: <name>_denoised.tif, <name>_deringed.tif, <name>_metrics.json, <name>_petro.json and <name>_report.pdf, plus an optional CSV run summary.

10 of 10 included - 10 with refer...

TEN SCANS PROCESSED IN ONE RUN

10 scans in 2 min 6 s, about 13 s each: 256³ Kirby and Leopard sub-volumes on one RTX 4080

WRITTEN FOR EVERY SCAN

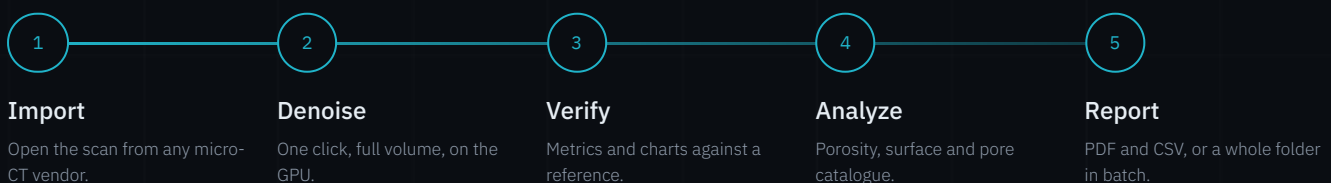
Denoised volume
name_denoised.tif

Quality metrics
name_metrics.json

Porosity
name_petro.json

PDF report
name_report.pdf

Run summary
CSV, all scans



FROM SCANNER TO REPORT

Fits the workflow you already have.

DATA FORMATS

TIFF / BigTIFF	read and write
DICOM-CT	series, with spacing
NRRD	raw and gzip
MetaImage	MHD / MHA, compressed
RAW / VOL	guided geometry import
Large volumes	memory-budgeted, out of core

SYSTEM REQUIREMENTS

System	Windows 10 or 11, 64-bit
Memory	8 GB minimum, 32 GB recommended
GPU	optional, NVIDIA with CUDA 12 driver
Disk	200 MB viewer, a few GB with GPU runtime
Licensing	signed licence file, node-locked
Data privacy	runs fully offline, data never leaves the PC

FREE

Viewer

Open and inspect any scan.

- All data formats
- 2D, MPR and 3D viewer
- Calibrated measurement
- Projects and screenshots

LICENCE

Pro

Everything, in one licence.

- Neural denoising
- Quality metrics and PDF report
- Petrophysics, pore and grain catalogue
- Batch processing of whole folders
- On-device training for your scanner

ON REQUEST

Lab and services

For teams and service labs.

- Multi-seat and site pricing
- Free test on your own scan
- Onboarding for your team
- Model adaptation to your scanner

BUILT FOR

Core analysis labs

Cleaner scans and defensible porosity for every client report.

Oil and gas R&D

Reservoir rock characterisation on your own workstation, offline.

Digital rock services

A faster, verifiable first step before segmentation and simulation.

Universities and beamlines

Low-dose and fast scans made usable for quantitative work.

HOW TO START

1. Send one scan

Any micro-CT volume of your rock, in any common format.

2. We run Denoxel on it

Denoised volume, quality metrics, porosity and a PDF report.

3. Compare and decide

Open the results in the free Viewer and judge them on your own data.

Try it on **your own scan**.

denoxel.com
contact@denoxel.com