



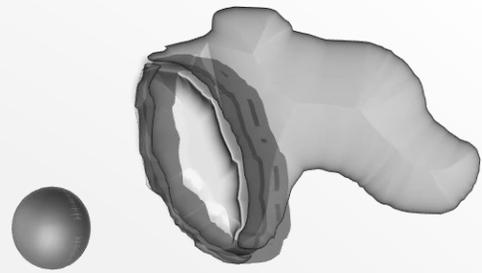
**Holo4D
Research**

Digital Holography Systems

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Holo4D Software



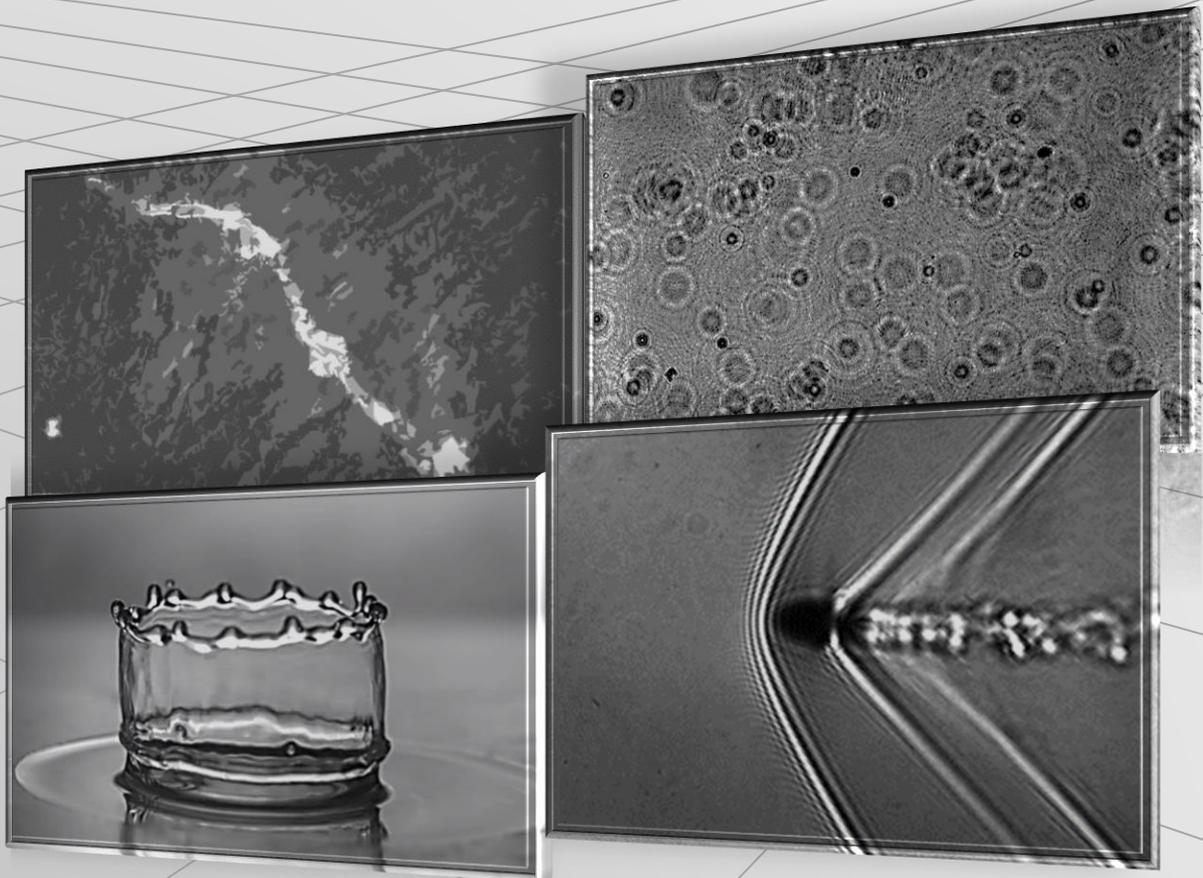
An all-in-one solution for holographic reconstruction

- ◆ Visualize in 3-dimensions
- ◆ Variety of reconstruction and filtering algorithms
- ◆ Adapt easily for inline & off-axis holography
- ◆ Amplitude & phase measurements with de-twinning
- ◆ Calibrate and remove optical distortion
- ◆ Particle field holography for 3D tracking and velocimetry with GPU acceleration
- ◆ Simulate holograms

The image displays several overlapping windows from the Holo4D software interface. The top window, titled 'Particle Field Holography', shows a 3D plot of particle trajectories in a coordinate system with axes x, y, and z in millimeters. A color bar at the bottom indicates 'Time (ms)' from 0 to 5. The middle window, titled 'Reconstruction', contains various control panels for 'Hologram' and 'Reference', including parameters for Wavelength (532 nm), Pixel size (6.450 μm), Magnification (0.172 X), and Propagation depth (6.92 cm). It also features a 'Depth slider' and 'De-twinning iterations' control. The bottom-left window, titled 'Calibration', shows a grid of calibration points and a 'Calibration successful' message. The bottom-right window, titled 'Simulation', shows a 2D plot of a simulated hologram and parameters for 'Wavelength' (532 nm) and 'Object size' (1000 μm).

A Robust Tool for Digital Reconstructions

- ◆ User-friendly interface
- ◆ Combine multiple propagation methods to increase resolution
- ◆ Various normalizations to enhance signal-to-noise ratio
- ◆ Compatible with holograms from any digital sensor recording
- ◆ Design digital holographic systems using simulations
- ◆ Determine 3D location and size of particles over time
- ◆ Create 3D trajectory, mean and instantaneous velocity plots
- ◆ Best suited for biomedical, aerospace, industrial and research applications



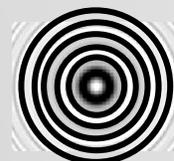
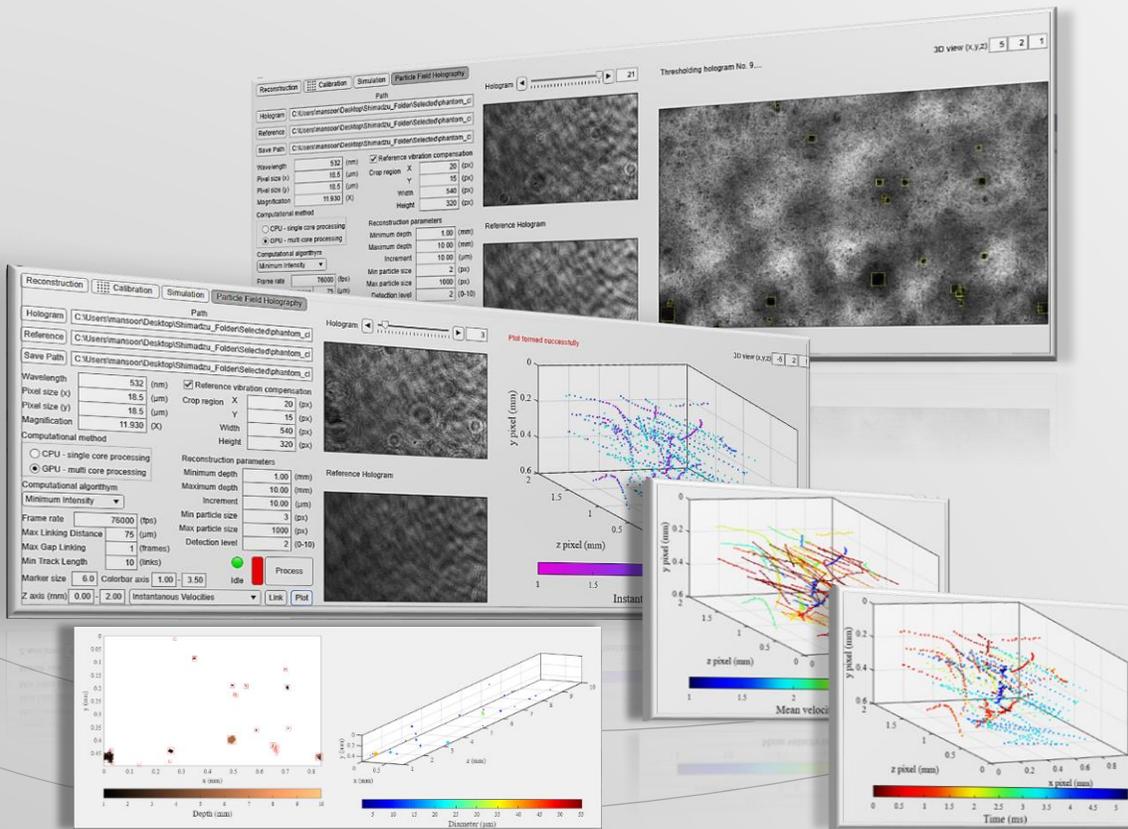
Specifications

Program specifications	
Hologram formats accepted	tiff, tif, png, bmp, jpeg , jpg
Hologram types	In-line & Off-axis (planar waves)
Inputs	Object & reference holograms (latter is optional), illumination wavelength, pixel size (length & width), system magnification, cross term location and size (off-axis holography), propagation distance
Background removal	Subtraction, Division, SDPM
Propagation methods	Angular Spectrum, Upsampling, Lowpass filtering, Fast Fourier Transform
Pre-propagation features	Sinc compensation, Zero padding
De-twinning	Two methods: Iterative or SDPM
Optical distortion removal	Fixed frequency distortion target (dot-pattern grid) calibration
Simulations	Simulate field-of-view, fringes captured, lateral resolution based on imaging sensor, setup and illumination of a spherical object.
Particle field holography	Determine 3D location and size of particles in sequential holograms using minimum intensity and maximum Tenengrad methods
Measurements	Amplitude, Phase (wrapped/unwrapped) 3D particle trajectories, mean velocities, instantaneous velocities
Reconstruction(s)	Single or batch processing
Save/Load	Settings, reconstruction, simulation
PC specifications	
Operating system	Windows 10 (64 bit)
CPU	Intel Core i3 or faster
GPU	NVIDIA graphics card with a compute capability of 3.5 and above
Memory	2 GB or more
Screen size	1328 × 510 or larger
Connection Port	USB 3.0
License	USB dongle (2.27" × 0.75" × 0.42")



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