OPTIGRID®

STRUCTURED-ILLUMINATION MICROSCOPY

REVOLUTIONARY OPTICAL SECTIONING SYSTEM

An accessible alternative to complicated and costly confocals
for High-contrast Fluorescence and Ultra-sharp 3D Imaging

QIOPTIQ
Optics with Intelligence

www.qioptiqimaging.com

Qioptiq Imaging Solutions

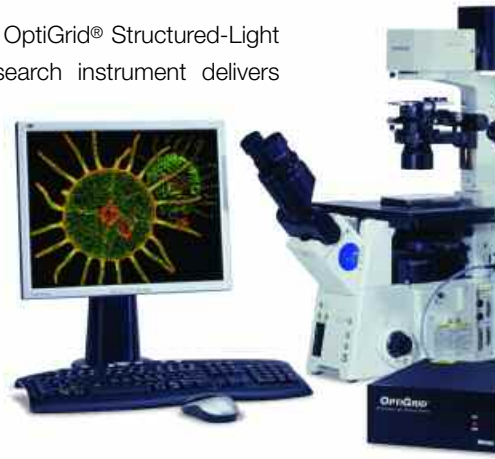
OPTIGRID® IMAGE THE POSSIBILITIES

Stop imagining the possibilities... and start *imagiing* them

Imagine being able to capture multi-channel fluorescence microscopy with unparalleled clarity... ultra-rich contrast, crystal clear edge definition, and razor sharp channel distinction.

Further imagine being able to do this using the existing instruments and software on your benchtop... no more confocal lab scheduling, no more tedious scan time, no more specimen-scorching lasers, no more assumptive software interpretations... just pure research!

Now capture everything you have imagined with the OptiGrid® Structured-Light Imaging System. This revolutionary new research instrument delivers haze-free multi-channel fluorescence and crisp, clear optical sectioning performance that rivals the most advanced confocal systems available today... and at a fraction of the cost!

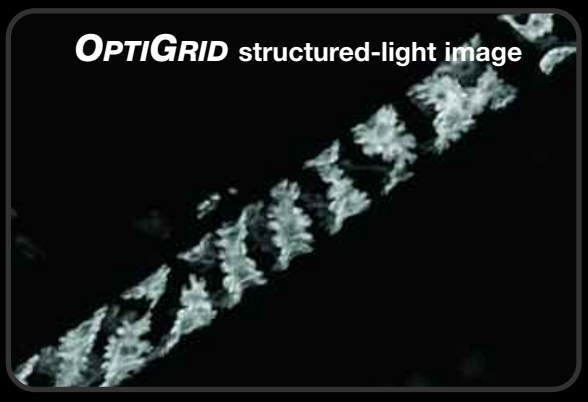


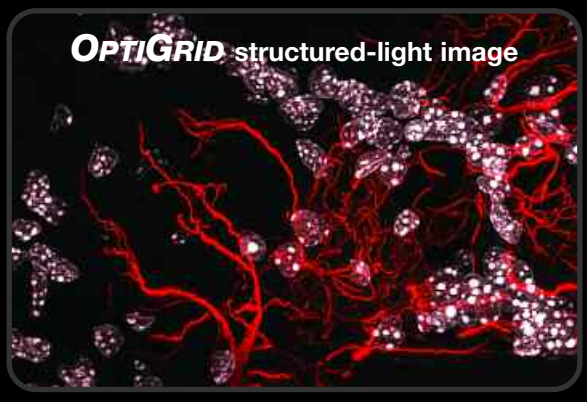
Spiro Gyra, fresh water algae (100µm section). Chlorophyll auto-fluoresence with Rhodamine (502nm) filter. 20X/0.75NA objective

courtesy of: ***D. S. Thomas, Qioptiq Imaging Solutions - beta test site***

Mouse brain, olfactory bulb (40µm section), stained for glial fibrilary acidic protein (red) with nucleic acid counterstain (white). 60x/1.4NA oil immersion objective.

courtesy of: ***Dr. Adam Puche, PhD - University of Maryland***



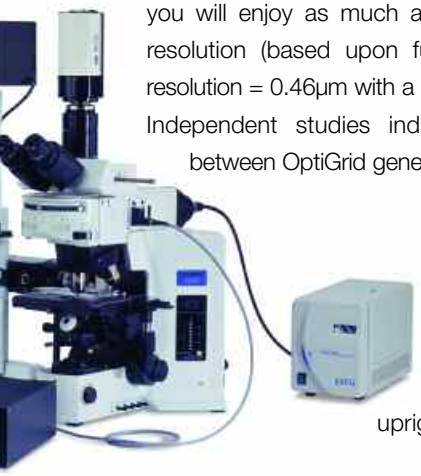


Raising the bar with structured-light

In its basic form, the OptiGrid System consists of a grid slider, an amplifier box and patented operating software. Within this unassuming package lies the ultimate research tool for expanding your imaging capabilities with simplicity, versatility and flexibility.

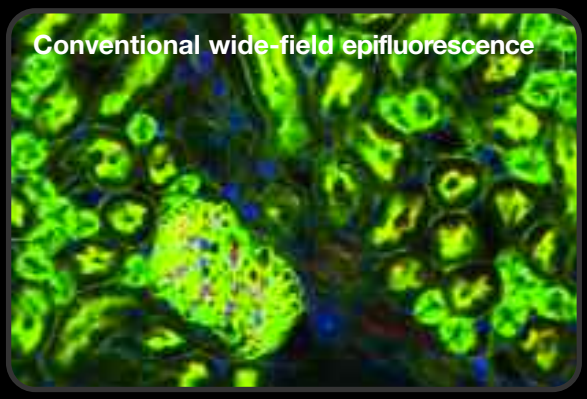
Image Quality You Can Publish

OptiGrid's high-quality imaging lends greater certainty to your research. Compared with conventional epifluorescence, you will enjoy as much as a 200% improvement in axial resolution (based upon full-width, half-max intensity, ΔZ resolution = 0.46µm with a 60X 1.4NA Plan Apo oil objective). Independent studies indicate no discernible difference between OptiGrid generated images and those of LSM.



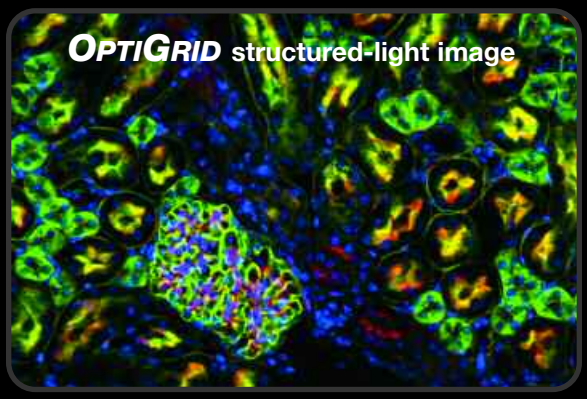
Seamless Integration

The OptiGrid System offers seamless integration into a wide variety of today's major brand upright and inverted microscopes.



Mouse kidney (16µm section) stained with Alexa Fluor 488 WGA (green), Alexa Fluor 568 Phalloidin (red) and DAPI (blue). 20X/0.75NA objective.

courtesy of: ***Mark Radin, Qioptiq Imaging Solutions - Applications Lab***



Simply load the software... plug in and connect the amplifier... and insert the grid slider into the field diaphragm slot of your illuminator... and you're seeing your research through a whole new light. Furthermore, OptiGrid's non-invasive design maintains the full conventional functionality of your host scope, lending versatility, stretching economy, and eliminating the need for a dedicated instrument.

Sharpened Learning Curve

OptiGrid empowers you to focus on your research and not on your tools. OptiGrid's driver software functions as a plug-in for Image-Pro and Volocity, affording you compatibility with your choice of both Macintosh or Windows platforms. A streamlined control interface minimizes the learning curve and allows you to work with your imagery in the familiarity of software with which you are already proficient.

Unprecedented Imaging Flexibility

OptiGrid is fully compatible with the standard illumination source of your microscope. With a generous 360 – 1000nm wavelength range, your imaging reach is limited only by your optics, illuminator and camera... If you can view it on screen, OptiGrid can capture it. Consider the possibilities of unrestricted fluorochrome compatibility... image specimens never before possible with alternative confocal methods.

Streamline Your Research with High-Speed Image Capture

OptiGrid wastes no time in capturing your images. Largely dependent upon your camera speed and software capture, OptiGrid can optimally generate a single structured-light image in as fast as a second. With OptiGrid driving your research, you can invest more time analyzing your data, and less time gathering it.

Boost Image Intensity and Specimen Penetration

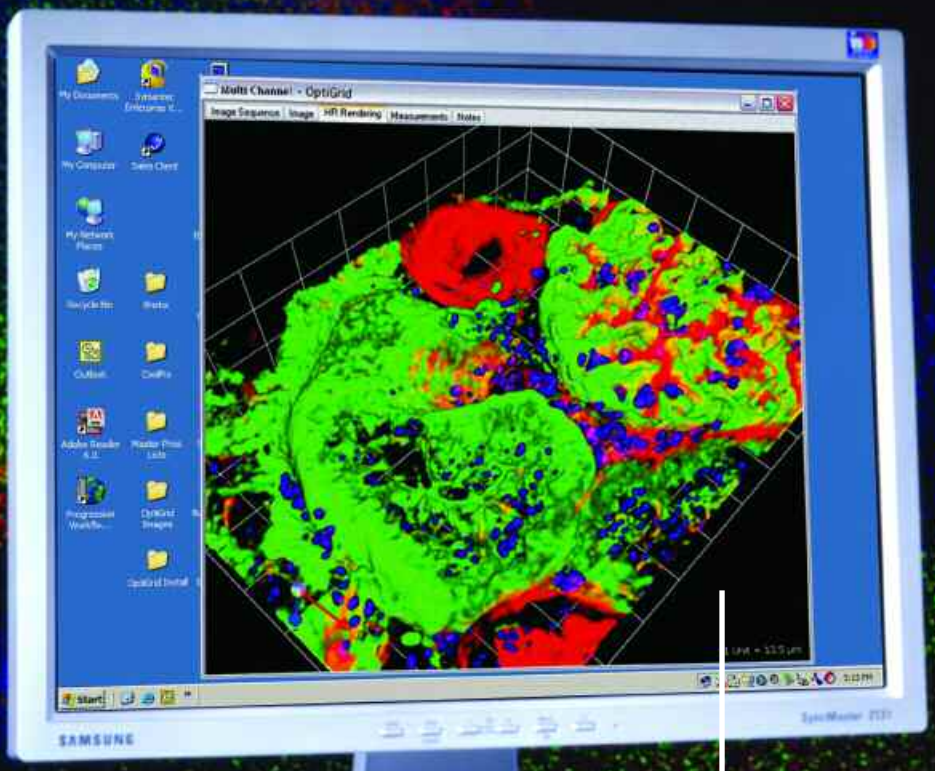
When working with thick specimens, OptiGrid's innovative optical design proves particularly advantageous. Consider light-efficiency gains up to 5X that of alternative optical sectioning technologies, and you begin to appreciate the possibilities that OptiGrid holds.

OPTIGRID® IMAGE THE POSSIBILITIES

The OptiGrid System...

Enjoy the comfort and economy of choice

The OptiGrid System features the flexibility to meet your individual research imaging needs, the expandability to satisfy your whole lab, and the economy to do both without breaking your budget. You likely already have much of the peripheral support necessary to join the OptiGrid imaging revolution, eliminating the need to re-equip your lab and leaving more funding to support your research.



Putting "personal" back in PC

Whether you prefer the universal versatility of Windows, or the sleek new interface of Mac OSX, OptiGrid respects your preference and offers compatibility across a variety of software environments.

OptiGrid™
Structured-Light Imaging System

Mac
Microsoft Windows
MediaCybernetics From Images to Answers®
Image-Pro PLUS
Volocity 3DM
Phylum Live™

You Choose the Camera

For maximum image quality and speed, we recommend a popular scientific imaging CCD from one of the manufacturers listed below.

HAMAMATSU
Q-IMAGING
PHOTOMETRIC
ROPER

Slider Simplicity

Simply insert the Grid Slider into the field diaphragm slot in your vertical illuminator to introduce OptiGrid capability into your microscope. Quick and easy interchange back to the field diaphragm slider restores full conventional functionality to your microscope. No more dedicated instrument tying up valuable benchtop space or program funds.

Enhance your microscope

OptiGrid integrates with a variety of popular brand microscopes to afford you maximum flexibility and economy.

LEICA
- DMLB 1000, 2000, 2500, 3000

NIKON
- Eclipse 80i, 90i
- E800/M, E1000/M
- TE2000
- Eclipse E400, E600, E600 FN

OLYMPUS
- MVX10 MacroView Zoom
- BX41, BX51/WI, BX61/WI
- IX51, IX71, IX81

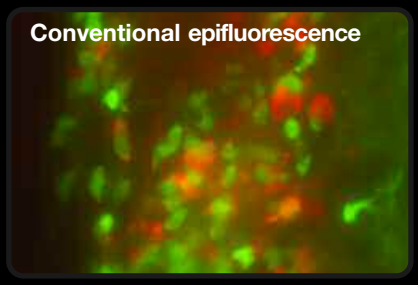
ZEISS
- Axiovert 200, Axiovert 200M
- Axioplan 2 Imaging/MOT
- AxioImager

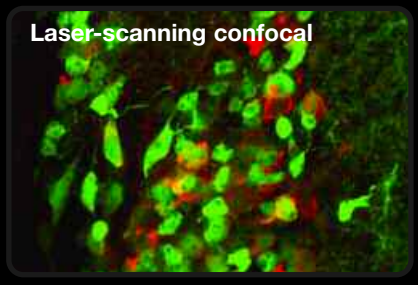
Considering the alternatives

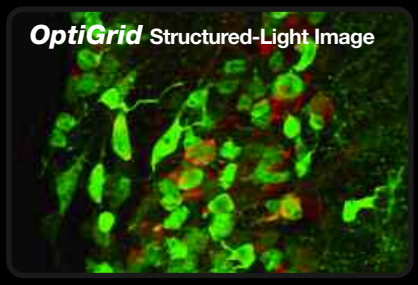
The images below were captured as part of an independent study comparing OptiGrid structured-light imaging (bottom) conventional wide-field epifluorescence (top) and laser scanning confocal, LSM (middle).

The research indicated significant gains in OptiGrid's structured-light imaging over conventional wide-field. It further notes that on ideal specimens (those with discrete elements, i.e., individual cells, dendrites, spines , organelles), there is no discernible difference between OptiGrid and LSM images. A significant finding when you consider OptiGrid's comparatively low entry cost.

Even with less than ideal specimens, the research further showed OptiGrid imaging to be exceptionally close to that of LSM.







Courtesy of: ***Dr. Adam Puche, PhD***
University of Maryland

Mouse brain olfactory bulb (25µm section) expressing green fluorescent protein (green) and stained for tyrosine hydroxylase (red). 60x/1.4NA oil immersion objective.

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Structured Light...
The technology driving your next imaging system

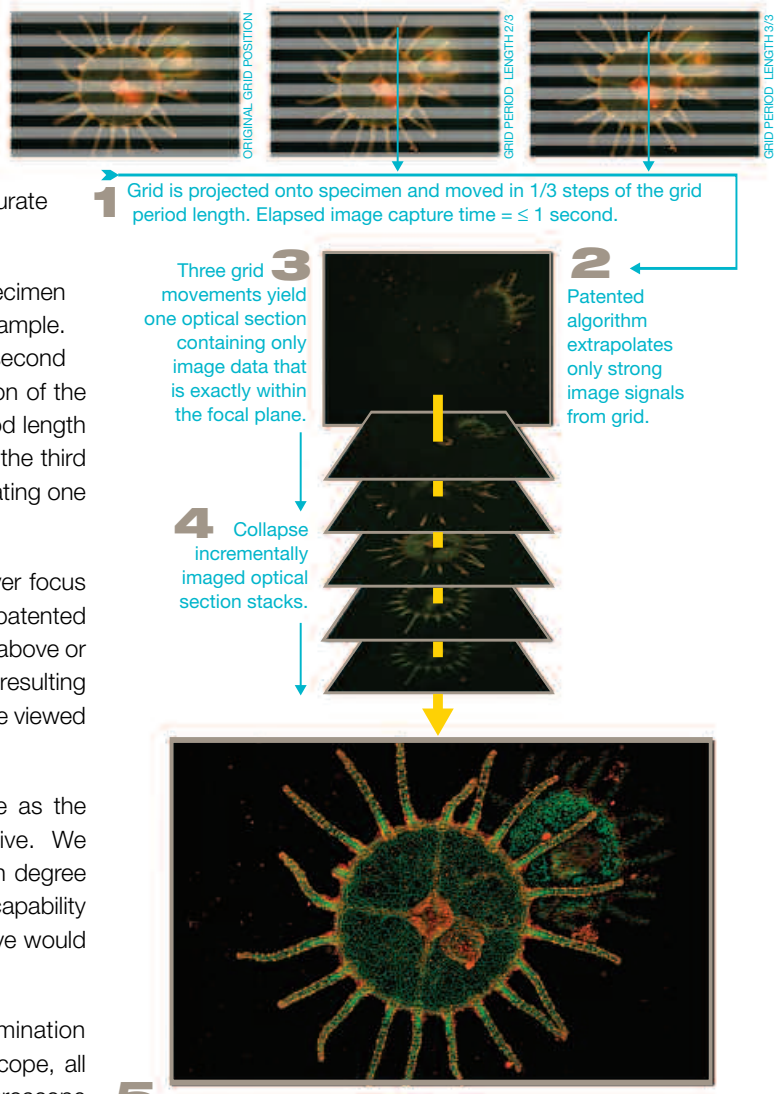
At the heart of OptiGrid lies a one-dimensional optical grid mounted on a piezo-electronically driven actuator. Once inserted into the light path of your illuminator, amplified voltage is applied to the piezo crystal to change its length. The piezo crystal provides highly accurate repositioning of the grid pattern.

The grid pattern is systematically projected onto the specimen and is moved perpendicularly to the grid lines across the sample. One structured-light image actually consists of three split-second captures of the grid. The first image is taken at any position of the grid, the grid is then moved linearly by 1/3 of the grid period length to capture the second image, and another 1/3 to capture the third image. All this typically occurs in under one second, generating one structured-light image or optical section.

Optically speaking, the grid returns a strong signal wherever focus is sharp and a weak signal where focus is soft. The patented OptiGrid algorithm then eliminates the weaker signals from above or below the primary image plane as defined by the grid. The resulting image is free of any stray light or soft focus data, and can be viewed live on your computer monitor at near real time.

The two-point discrimination of the OptiGrid is the same as the resolving power of your selected microscope objective. We recommend that you choose an objective lens with a high degree of spherical aberration correction and UV-transmission capability (i.e., the OptiGrid resolution using a 60X, 1.4NA oil objective would be 0.19µm with 550nm wavelength).

Because OptiGrid utilizes the illumination source of the host wide-field microscope, all fluorescence capabilities of that microscope are maintained. When using fluorescence with the OptiGrid, the excitation and emission filters and dichloric mirrors should be optimized to the specific fluorophore being used.



Medusa form of Obelia jellyfish (200µm section) fluorescence. 10X/0.40NA objective. Courtesy of: ***Dr. Brian Matsumoto, PhD****, University of California, Santa Barbara.*

Recommended Accessories for your OptiGrid System

STABILIZED FLUORESCENCE

Maximize light intensity, control and image quality with a stabilized fluorescence source.

Z-STAGE DRIVER

Realize OptiGrid's full optical sectioning potential for 3D reconstructions with the addition of any popular Z-axis stage controller.

ANTI-VIBRATION PLATFORM

Due to OptiGrid's exceptional resolution power, we recommend a vibration stage for maximum imaging stability.

OptiGrid Specifications

Optical Performance:

(Based upon 60X/1.4 NA oil immersion objective, 1300x1030 CCD monochrome camera, 30 lp/mm Grid)

Z-Sectioning (at FWHM) 0.46µm

Optical Section Acquisition Speed .....≤ 1 sec. (full frame)

Wavelength Range .....NUV thru NIR (360 – 1000 nm)

** Specifications vary depending upon configuration.*

System Hardware:

Amplifier Box footprint .....8”W x 3”H x 10”L

Computer Recommendations:

(Refer to Improvision and Media Cybernetics specifications)

Operating System(s).....Windows 2000, XP Pro, Mac OS

Processor .....Pentium IV or later, 1GHz (min.)

Memory .....1Gb RAM

PCI Bus Slot .....1 available for D/A board

Hard Drive available .....10 Gb (min.)

CD-ROM .....4X speed (min.)

Monitor.....SVGA recommended, VGA (min.)

Graphics Card.....VGA high color, 64 Mb (min.)

Software.....Image Pro 4.5 (Scope Pro 4.1) or later

Volocity 3.0 or later

CCD .....Supported by Image Pro, Volocity or associated frame grabber or 1394 Firewire

RS232 Port .....(for focus controllers)

Volocity 3DM

Phylum Live

MediaCybernetics From Images to Answers

Image-Pro PLUS

Mac

Microsoft Windows

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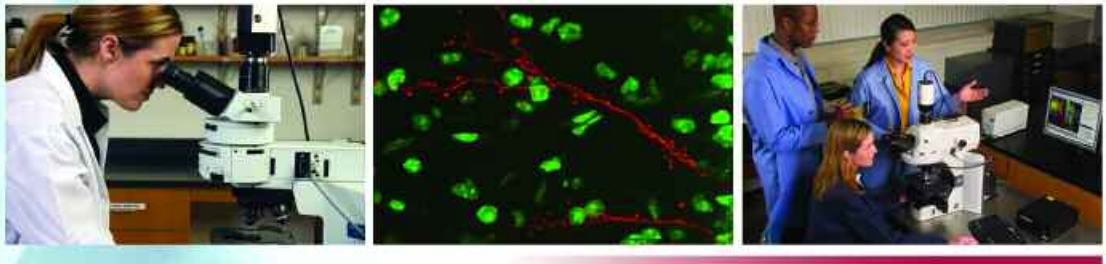
ISO 9001:2000



....image the possibilities

Volocity 3DM

Phylum Live™

MediaCybernetics
From Images to Answers®

Image-Pro PLUS

Mac

Microsoft® Windows

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