

HAMAMATSU

OEM CAMERAS

INFORMATION DELIVERED

A leader in the
PHOTONICS INDUSTRY

LET'S GET STARTED

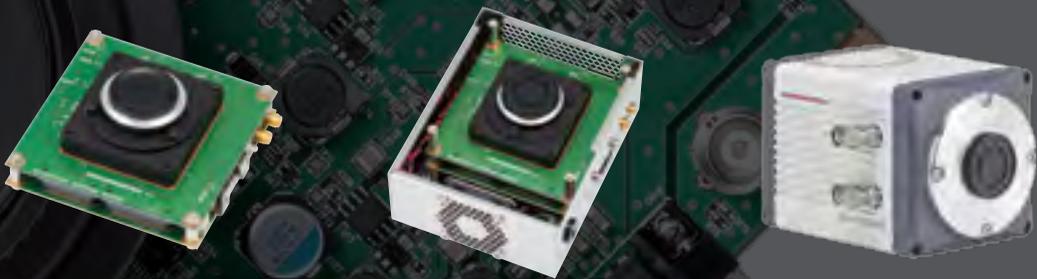
CAMERA OEM

SOLUTIONS BY HAMAMATSU



WE MAKE CAMERAS

You know Hamamatsu. You know us for our high quality optical sensors, including our PMTs, photodiodes and CCDs. But did you know that Hamamatsu also makes OEM cameras? For imaging with X-rays to near IR,



Hamamatsu OEM cameras implement cutting edge scientific CMOS (sCMOS), time delayed integration-CCDs (TDI-CCDs) as well as standard and completely custom CCDs and CMOS detectors. We excel at extracting the best performance from any image sensor.

WE DELIVER DATA

What is a camera? A sensor with some basic electronics around it? Plug it in and it detects light, provides a picture and measures some relative intensities. It's just a camera. Except it's not... You know that in a precision instrument, the camera is the heart of the device *because it delivers the information that answers your question*. At Hamamatsu, we never risk thinking of your camera as “just a camera.”

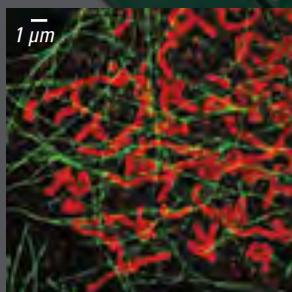


Fig. 1

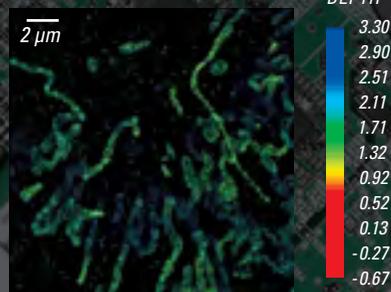


Fig. 2

Images provided by Dr. Manasa Gudheti at Bruker, in collaboration with Dr. Scott Cameron (UC Davis), Dr. Hamed Arami and Dr. Marc Kanow (University of Washington). Both images were collected with a Bruker Vutara 350 single molecule 3D super-resolution microscope equipped with a Hamamatsu ORCA-Flash4.0 V2 sCMOS camera. By rapidly capturing many short exposure (5ms) images and applying specialized imaging paradigms, the Bruker system is able to break the optical resolution barrier to allow identification of single molecules (Figure 1, TOM20 outer mitochondrial protein in red, tubulin in green) and to see with super-resolution quality within a 3μm z-stack (Figure 2).

WE REDUCE RISK



CUSTOMIZED IMAGE SIMULATION

How can you eliminate the guesswork of choosing a camera without installing a single new piece of hardware? Utilizing the most accurate noise models for image detectors, our Camera Simulation Engine (CSE) enables powerful and predictive virtual demos. By generating simulated images and analysis that demonstrate the effects of different technologies, operational modes and computational algorithms on your data, our CSE can eliminate months of hardware testing.



ROBUST ENGINEERING

How can you be confident your system is stable and robust? Hamamatsu hardware quality is renowned, but our software engineers also deliver. Our DCAM-SDK provides an easy to implement, stable and fully supported bridge to integrate our cameras into your instruments. This precision toolkit supports all Hamamatsu cameras and features including an advanced repertoire of triggering modes and high speed data acquisition.



TECHNOLOGICAL CO-EVOLUTION

How will you maintain your market edge? Your customers expect your products to evolve. They must be faster, better, smaller and competitively priced. By sharing our long-term visions we can design cameras, from moderately tailored to fully customized, that meet your market needs three to five years down the road. Let's get started.



HAMAMATSU

You need to make a camera decision.

DELIVERS THE

You need to get the highest quality data

INFORMATION

from your images. You should talk to us.

YOU NEED.

CHOOSING THE RIGHT CAMERA

Understanding the application and the information that must be acquired from the image elevates the process of choosing a camera from a transaction to a relationship. From life science to semiconductor, our camera OEM team brings the application expertise to engage.

TOPICS OF DISCUSSION:

- Imaging goals
 - Current set-up and missing capabilities
 - Sample characteristics: wavelength, light intensity, movement, size of object(s)
 - Priorities: pixel throughput, SNR, exposure time, cost
 - Adjustable system elements: input light level, optics, scan speeds, wavelength
-

WHAT WE CAN OFFER:

- Extensive knowledge of 2D imaging sensors including CCDs, time delayed integration-CCDs (TDI-CCD), electron-multiplying CCDs (EM-CCDs) and scientific CMOS (sCMOS) from internal and external sources
- Virtual comparison of any cameras or system parameters using our Camera Simulation Engine (CSE) to arrive at a precise conclusion regarding camera performance for your application
 - ♦ *Utilizes advanced noise models to produce accurate image simulations with either test images or actual images from your system*
- Demo cameras
- Fast-to-implement camera modifications to achieve tailored performance and physical fit
 - ♦ *Firmware: offset level, exposure min/max, bit depth range, pixel calibration*
 - ♦ *Hardware: mounting, chassis and form factor adjustments*
- Mid-level camera modifications to streamline the system, lower costs and extract the most data
 - ♦ *Firmware: custom modifications of algorithms for noise reduction or data extraction*
 - ♦ *Hardware: cooling level, optimal connectivity, module creation, custom form factor*

GETTING THE MOST FROM YOUR CAMERA

Advanced imaging systems are a symphony of moving parts: calibration, illumination, focus, sample movement and prep as well as data output, analysis and storage. We can help you conduct the ensemble.

TOPICS OF DISCUSSION:

- Camera interface selection
- Triggering and synchronization of system components
- Matching optics and illumination to camera
- Optimization of acquisition speed and duty cycle
- Ideal SNR for accurate analysis

WHAT WE CAN OFFER:

- Software Developers Kit (DCAM-SDK) enables easily programmable communication between the host application and all Hamamatsu cameras and features
 - ♦ *Available for Windows and Linux*
 - ♦ *Complete dynamic link library (DLL) and samples of C code*
- Distributable API (DCAM-API) allows unencumbered release of host applications
- MATLAB® and LabVIEW support for camera acquisition to advanced features
- State of the art computer hardware and data storage expertise
- Advanced timing diagrams for camera synchronization and triggering
- Experience capturing high frame rate quantitative data while maintaining data integrity
- Advanced simulations using our CSE for comparing various settings within a given system
 - ♦ *CSE can output comparisons with different magnification, scan speeds, signal and background levels, wavelength, noise levels, binning, gain and cooling*
 - ♦ *Provides clear-cut and reliable answers with minimal effort*
- Modular optics and mounting options designed to match your camera and system
- Additional photonics components such as optical splitters, illumination source, flow cells and other component level detectors

STAYING AHEAD IN YOUR MARKET

Even before instrument v1 is out the door, the next generation project is on the drawing board. How can you succeed with v2 and still satisfy cost, performance and delivery targets? We can help your products evolve.

TOPICS OF DISCUSSION:

- Roadmap alignment
 - Areas of camera performance improvement and cost reduction: SNR, speed, field of view, throughput, form factor, connectivity, cooling
 - Translating market needs into instrument improvements achievable through imaging
 - Consideration of custom development of a sensor and/or camera
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WHAT WE CAN OFFER:

- Confidential insights into our camera development roadmap
- Long-term planning for new and/or custom imaging hardware
- Extensive experience considering industry specific pressures: FDA approvals, government grant cycles, manufacturing clean room requirements, UV sensitive optics, ISO and CE certification and more
- Analysis of current and proposed camera and system options using the CSE with customized noise models to establish optimal direction
- Exploration of market available sensors or development of custom sensors
- Continuous and accessible contact with our hardware and software design engineers to facilitate complete collaboration
 - ♦ *Regional support available to minimize response times*
- Advanced algorithms for data reduction embedded in the camera
- Customized camera FPGA programming to extract exactly the image data you need and support to virtually explore and optimize FPGA code prior to installing in camera
- Discussion of new, cutting edge computational imaging techniques that can enhance resolution, SNR, throughput, data analysis and ease of data storage while maintaining data integrity

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PHOTON IS OUR BUSINESS

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