



# Basler PowerPack

FOR MICROSCOPY

- Choose your complete plug-and-play microscopy package
- Count on high performance cameras
- Work with professional software for image acquisition and analysis
- Save time in routine work and use advanced image enhancement technology



## OVERVIEW

### Basler PowerPack for Microscopy – Tailored All-round Package for Precision Without Compromises

Implementing microscopy applications means juggling your system's unique requirements against your own needs. Visualization and monitoring, image capturing, processing and/or analysis, as well as discussion, documentation and archiving in life science, medical or industrial settings: each task must provide insights into fine details, structure and function of the most varied and smallest objects.

Digital cameras provide the highest image quality in real-time, plus outstanding color reproduction and fidelity, and a high dynamic range. These are prerequisites essential for reproducible, detailed observation, differentiation and analysis of the most delicate structures in materials or biological samples.

Thanks to Basler's modular PowerPack concept, you can now tailor your camera system without compromises. Benefit from Basler's high quality cameras with all necessary components at your fingertips for a simple system setup and easy installation. Rely on precise and reliable imaging, as well as on professional software for image acquisition and analysis.

AT BASLER, WE GIVE TECHNOLOGY  
THE POWER OF SIGHT.



## OVERVIEW

### Pick and Choose Your Camera

Based on today's ambitious microscopy requirements, Basler offers color cameras equipped with the standardized USB 3.0 interface in various performance configurations:

- State-of-the-art CMOS sensor technology provides highest performance.
- Resolutions from 1.2 MP to 12.2 MP produce top-notch image quality.
- For capturing moving objects or real-time visualization, up to 200 images per second offer complete and reliable image processing.

Choose **Basler Microscopy pulse** for best cost efficiency.

Choose **Basler Microscopy ace** to meet highest performance requirements.



### Benefit From Compatible Equipment Setup and Easy Quick Start

Your Basler PowerPack is designed for an easy system setup. With your chosen camera, you receive a tested USB 3.0 cable, a simple-to-understand quick install guide, as well as professional microscopy software. The PowerPack with pulse microscopy camera also includes a CS- to C-mount adapter for trouble-free system assembly. These components enable you to test your system and to start working immediately.

#### Quick Install Guide

Simple to understand Quick Install Guide with step-by-step instructions

#### USB 3.0 Cable

High quality USB 3.0 cable tested for plug-and-play and reliable operation

#### Basler Microscopy Software

Professional software for image acquisition and analysis included in each PowerPack

#### CS- to C-Mount Adapter Ring

For each pulse camera, adapter produced with high precision for ideal C-mount adaption



## Choose a Microscopy Camera Tailored to Your Requirements

		Basler Microscopy pulse	Basler Microscopy ace	
		Best Value for Money	Enjoy Highest Performance	
Technology	Sensor technology	ON Semiconductor 1/3.7" - 1/2.5" CMOS	Sony PREGIUS 1/1.8" - 2/3" CMOS	ON Semiconductor 1/2"
	Resolution [MP]	1.2 - 5.0 MP	1.3 - 12.2 MP	1.3 MP
	Speed [fps]	14 - 54 fps	35 - 55 fps	160 - 200
Applications	Standard light microscopy	✓	✓	✓
	Fluorescence	-	✓	-
	Education	✓	-	-
	Monitoring, documentation, archiving	✓	✓	✓
	Medical & life sciences	-	✓	-
	Industrial	✓	✓	✓
	Sperm analysis	-	-	✓

Many routine microscopic applications in industrial, biological or medical laboratory settings, such as those in materials science, histology, cell biology, hematology or microbiology, are based on light microscopy using various illumination and contrast methods. Today, cameras are a central part of these applications and are used wherever it is important to monitor images "live", and to discuss, capture, analyze and archive them. Cameras in conventional light microscopy must reliably deliver high-resolution, pin-sharp images with appealing color fidelity.

### Your benefits include:

- Outstanding image quality and reproducible results
- New image enhancement and color adjustment algorithms
- Both video recording and image sequences for time-lapse microscopy
- Best price/performance ratio, and German precision manufacturing

## Trust in State-of-the-Art Vision Technology Made in Germany



30 years of experience makes Basler's equipment the most reliable and trusted industrial vision technology in the market. As a key driver of technology trends and vision standards, we measure our cameras and their components against the highest standards and offer outstanding quality for reproducible pictures and reliable analysis.

We are constantly developing and improving our products. Already today, we install many cameras into medical and life science applications. These digital cameras must provide highest image quality and exceptional color reproduction. New advanced image enhancement and color adjustment algorithms enable consistent and repeatable color fidelity, and perfectly reproduce pictures of challenging samples. Thanks to exhaustive quality assurance measures, long-lasting camera life is a given. We also stand for long-term market availability of our cameras, to make your decision worthwhile and satisfying.

## Sensor Technology Shift: CMOS Now Better Than CCD

CCD sensors are very typical for microscope cameras. They offer good results for example in low-light conditions such as in fluorescence applications. Even with long exposure times, they generate an acceptable noise level caused by physics and the electronics inside an image sensor. And for a long time, the CCD sensor technology was leading the market with the best available performance. As the world-leading manufacturer of CCD sensors decided in 2015 to stop producing and investing in this technology, no major new inventions or developments have been made to expand the CCD technology. CMOS technology on the other hand has experienced heavy investment. It can keep up with the high quality of CCD sensors and can now deliver even better image quality. For example, the noise ratio has been brought down to a very low level and the dynamic range improved, which is helpful for recording high differences in brightness between subject and background.

In addition to the high performance of CMOS sensors, the limited availability of CCD sensors is pushing this technology shift forward, as cameras with CCD sensors will shortly be discontinued. The following table contains typical CCD sensors which have been integrated into many scientific-application cameras. The specifications show the advantages of the next-generation CMOS sensors offered when choosing one of Basler's microscopy cameras:

Advantages of new CMOS sensor technology	CCD → CMOS		CCD → CMOS	
Camera Model	Basler scout	Basler Microscopy ace 2.3MP	Basler pilot	Basler Microscopy ace 5.1MP
Sensor	Sony ICX274	Sony PREGIUS	Sony ICX625	Sony PREGIUS
Resolution	1.4 MP	2.3 MP	5.0 MP	5.1 MP
Pixel Size	6.45 μm	5.86 μm	3.45 μm	3.45 μm
Frame Rate	17 fps	40 fps	17 fps	35 fps
Quantum Efficiency	58 %	70 %	47 %	67 %
Temporal Dark Noise	7.8 e-	6.8 e-	12.7 e-	2.25 e-
Dynamic Range	67.7 dB	73.6 dB	54.8 dB	73.0 dB





## Highlights: Basler Microscopy pulse

### Reliable lightweight

The Basler Microscopy pulse cameras with resolutions between 1.2 MP and 5 MP come in with USB 3.0 as standard interface. USB 2.0 backward compatibility offers maximum system flexibility. The cameras are specifically designed to be cost-effective and easy to use. High frame rates allow for smooth live viewing, fast focusing and sample screening. The rock-solid image quality provided by the established ON Semi-

conductor CMOS sensor technology offers accurate and reproducible results for a broad range of standard light microscopy applications in educational settings, as well as life science, fluorescence, diagnostics, materials or industrial inspection. Our newly-implemented image enhancement and color adjustment algorithms enable outstanding color reproduction and brilliant contrasts.

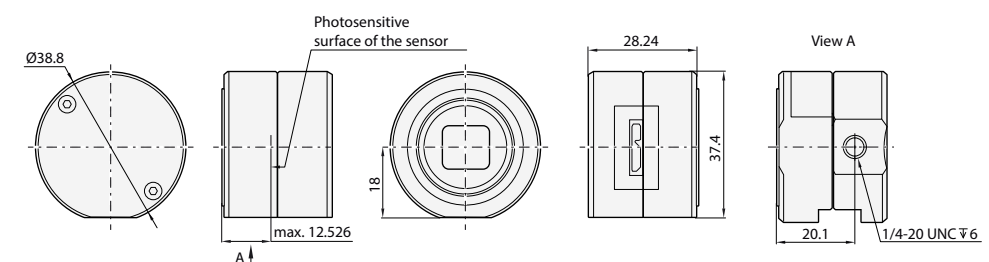


## Specifications

Basler Microscopy Camera	Microscopy pulse 1.2 MP	Microscopy pulse 2.0 MP	Microscopy pulse 3.3 MP	Microscopy pulse 5.0 MP
Resolution (H×V) [pixels]	1280×960	1920×1080	2048×1584	2592×1944
Sensor	ON Semiconductor			
Sensor Size (optical)	1/3"	1/3.7"	1/3"	1/2.5"
Sensor Technology	CMOS Global Shutter	CMOS Rolling Shutter	CMOS Rolling Shutter	CMOS Rolling Shutter
Pixel Size [µm²]	3.75×3.75	2.2×2.2	2.2×2.2	2.2×2.2
Active Area [mm]	6.00	4.85	5.70	7.13
Max. Frame Rate [fps]	54	30	20	14
Temporal Dark Noise [e-]	5.12	6.4	6.4	6.4
Dynamic Range [dB]	64	70.1	70.1	70.1
Exposure Control	Manual and Automatic			
Gain	Manual			
Mono / Color	Color			
Interface	USB 3.0			
<b>Mechanical/Electrical</b>				
Dimensions (d×L) [mm]	38.8×28.2			
Temperature Range	0°C - 50°C			
Lens Mount	CS-mount			
Microscope Camera Adapter	0.3×, 0.33×, 0.35×	0.3×	0.3×, 0.33×, 0.35×	0.45×, 0.5×, 0.55×
Power Consumption (typical) [W]	≈1.3			
Weight (typical) [g]	<60			
Conformity	CE, RoHS, GenICam, UL, FCC, USB3 Vision			
<b>Software Environment</b>				
Operating System	Windows 7, Windows 8.1, Windows 10 - 32 bit and 64 bit			

Specifications are subject to change without prior notice. Latest specifications and availability can be found on our website [www.baslerweb.com](http://www.baslerweb.com). Please visit [www.baslerweb.com/manuals](http://www.baslerweb.com/manuals) for the detailed camera User's Manual and [www.baslerweb.com/thirdparty](http://www.baslerweb.com/thirdparty) for information on third party software.

## Dimensions (in mm)



## Highlights: Basler Microscopy ace

### Exceptional performance of Sony PREGIUS sensors

The Basler Microscopy ace cameras feature Sony's latest-generation IMX CMOS sensors. Thanks to these global shutter sensors, the cameras offer low noise levels down to 2.2 e-, a large dynamic range of roughly 73 dB, and quantum efficiencies over 70 %. In this way, the Basler Microscopy ace models with resolutions up to 12.2 MP achieve a new level of image quality, which makes them the ideal choice for moderate-to-challenging microscopy applications in life science, fluo-

rescence, diagnostics, materials science, engineering technology, forensics and many others.

Newly implemented image enhancement and color adjustment algorithms enable exceptional color reproduction and sharpness for precise and reliable true-to-life results. The ultra-high frame rates of up to 200 fps allow for smooth live video preview, fast focusing and sample screening even at full resolution.

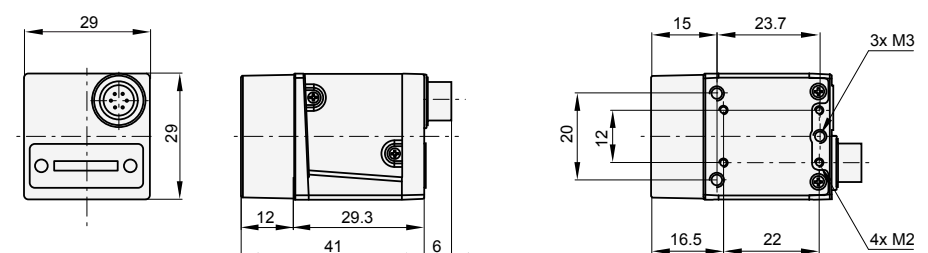


## Specifications

Basler Microscopy Camera	Microscopy ace 1.3 MP 48	Microscopy ace 1.3 MP 160	Microscopy ace 1.3 MP 200	Microscopy ace 2.3 MP Mono <span style="color:red">NEW</span>	Microscopy ace 2.3 MP Color
Resolution (H×V) [pixels]	1280×1024	1280×1024	1280×1024	1920×1200	1920×1200
Sensor	Sony PREGIUS	ON Semiconductor	ON Semiconductor	Sony PREGIUS	Sony PREGIUS
Sensor Size (optical)	1/1.8"	1/2"	1/2"	1/1.2"	1/1.2"
Sensor Technology	CMOS Global Shutter				
Pixel Size [µm²]	5.86×5.86	4.80×4.80	4.80×4.80	5.86×5.86	5.86×5.86
Active Area [mm]	9.60	7.90	7.90	13.30	13.30
Max. Frame Rate [fps]	48	160	200	40	40
Temporal Dark Noise [e-]	6.83	8.9	10.6	6.83	6.83
Dynamic Range [dB]	73.0	56.2	56.3	73.0	73.0
Exposure Control	Manual and Automatic				
Gain	Manual				
Mono / Color	Color	Color	Mono	Mono	Color
Interface	USB 3.0				
<b>Mechanical/Electrical</b>					
Dimensions (L×W×H) [mm]	29.3×29.0×29.0				
Temperature Range	0°C - 50°C				
Lens Mount	C-mount				
Microscope Camera Adapter	0.45×, 0.5×, 0.55×	0.5×	0.5×	1× - 1.2×	1× - 1.2×
Power Consumption (typical) [W]	≈2.9	3.0	3.0	3.7	3.7
Weight (typical) [g]	80				
Conformity	CE, RoHS, GenICam, UL, FCC, USB3 Vision				
<b>Software Environment</b>					
Operating System	Windows 7, Windows 8.1, Windows 10 - 32 bit and 64 bit				

Specifications are subject to change without prior notice. Latest specifications and availability can be found on our website [www.baslerweb.com](http://www.baslerweb.com). Please visit [www.baslerweb.com/manuals](http://www.baslerweb.com/manuals) for the detailed camera User's Manual and [www.baslerweb.com/thirdparty](http://www.baslerweb.com/thirdparty) for information on third party software.

## Dimensions (in mm)

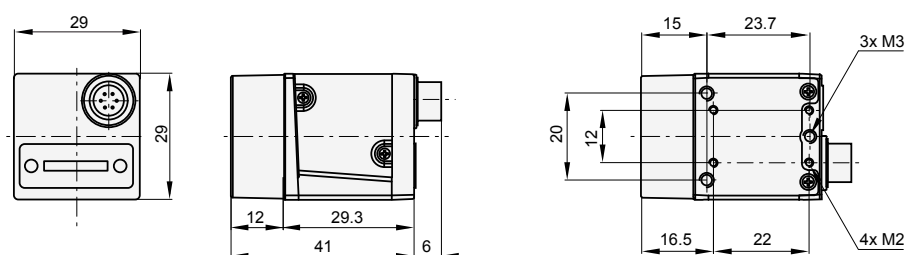


## TECHNICAL DETAILS

### Specifications

Basler Microscopy Camera	Microscopy ace 3.2 MP	<b>NEW</b> Microscopy ace 5.1 MP Mono	Microscopy ace 5.1 MP Color	<b>NEW</b> Microscopy ace 12.2 MP
Resolution (H×V) [pixels]	2048×1536	2448×2048	2448×2048	4024×3036
Sensor	Sony PREGIUS	Sony PREGIUS	Sony PREGIUS	Sony STARVIS
Sensor Size (optical)	1/1.8"	2/3"	2/3"	1/1.7"
Sensor Technology	CMOS Global Shutter			
Pixel Size [ $\mu\text{m}^2$ ]	3.45×3.45	3.45×3.45	3.45×3.45	1.85×1.85
Active Area [mm]	9.00	11.20	11.20	9.30
Max. Frame Rate [fps]	55	35	35	15
Temporal Dark Noise [e-]	2.22	2.25	2.25	3.2
Dynamic Range [dB]	71.4	70.6	70.6	71.0
Exposure Control	Manual and Automatic			
Gain	Manual			
Mono / Color	Color	Mono	Color	Color
Interface	USB 3.0			
<b>Mechanical/Electrical</b>				
Dimensions (L×W×H) [mm]	29.3×29.0×29.0			
Temperature Range	0°C - 50°C			
Lens Mount	C-mount			
Microscope Camera Adapter	0.5×	0.67×, 1.0×	0.67×, 1.0×	0.45×, 0.5×, 0.55×
Power Consumption (typical) [W]	2.6	2.7	2.7	3
Weight (typical) [g]	80			
Conformity	CE, RoHS, GenICam, UL, FCC, USB3 Vision			
<b>Software Environment</b>				
Operating System	Windows 7, Windows 8.1, Windows 10 - 32 bit and 64 bit			
Specifications are subject to change without prior notice. Latest specifications and availability can be found on our <a href="http://www.baslerweb.com">website www.baslerweb.com</a> . Please visit <a href="http://www.baslerweb.com/manuals">www.baslerweb.com/manuals</a> for the detailed camera User's Manual and <a href="http://www.baslerweb.com/thirdparty">www.baslerweb.com/thirdparty</a> for information on third party software.				

### Dimensions (in mm)



## APPLICATIONS

### Imaging Requirements More Challenging Than Ever

The wide variety in modern microscope applications means demanding requirements placed on camera systems. Nowadays, a microscope camera needs to fulfil the following specifications:

Requirement	Benefit
High resolution	Increased field of view
High frame rates even at high resolution	Detailed monitoring of intra-cell transportation or other change processes
High sensitivity and low noise	Good image quality even at long exposure times (e.g. in fluorescence applications)
High dynamic ranges	Display high differences in brightness and other aspects between subject and background
Good price performance	Decreased price per system while retaining high-quality imaging results

Basler is a leading manufacturer of high-quality digital cameras and accessories for medicine and other markets. Our cameras are not only known for their outstanding performance and state-of-the-art technology. They also fulfil the toughest requirements and offer a high application fit at a very good price performance ratio.

### Get the Best Results for Your Application

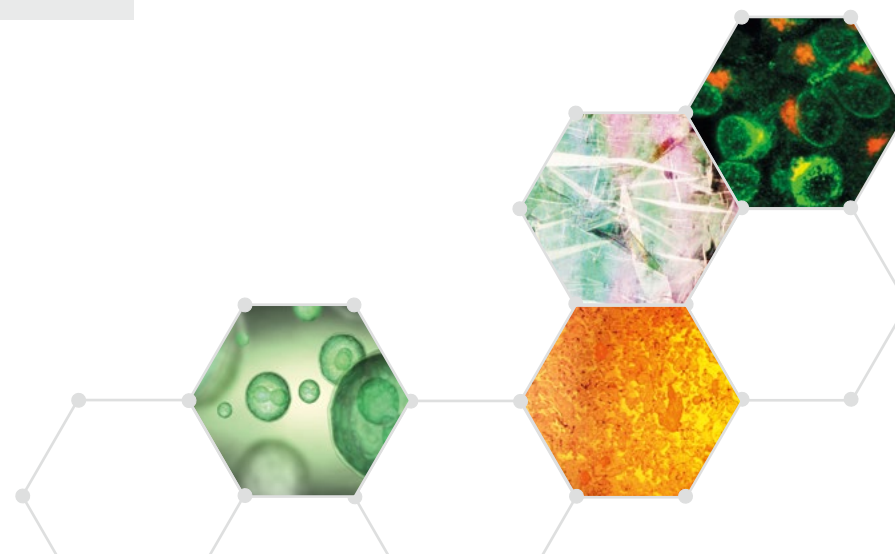
Basler's PowerPacks for Microscopy includes cameras with the latest and most cost-effective CMOS technology. In combination with the professional and easy-to-use software, the cameras are perfectly suited for a wide range of optical microscopy applications.

#### Technology

- Brightfield
- Contrasting methods
- Darkfield
- Standard fluorescence

#### Application area

- Education
- Industry (chemical and pharmaceutical industry, microelectronics, semiconductor industry)
- Materials science and engineering technology
- Forensics
- Life Sciences (cell biology, developmental biology, zoology and plant science, neuroscience)
- Spermatology
- Diagnostics (histology, pathology, hematology, cytology, microbiology)





## FLUORESCENCE IMAGING

### Best Imaging Results With Less Effort

Fluorescence imaging of cells is a very common application for studying cellular processes and events. At the same time, it is also one of the most challenging techniques in the microscopy area. Basler offers several benefits with its Basler PowerPack for Microscopy, to achieve outstanding imaging results and make fluorescence imaging convenient to use.

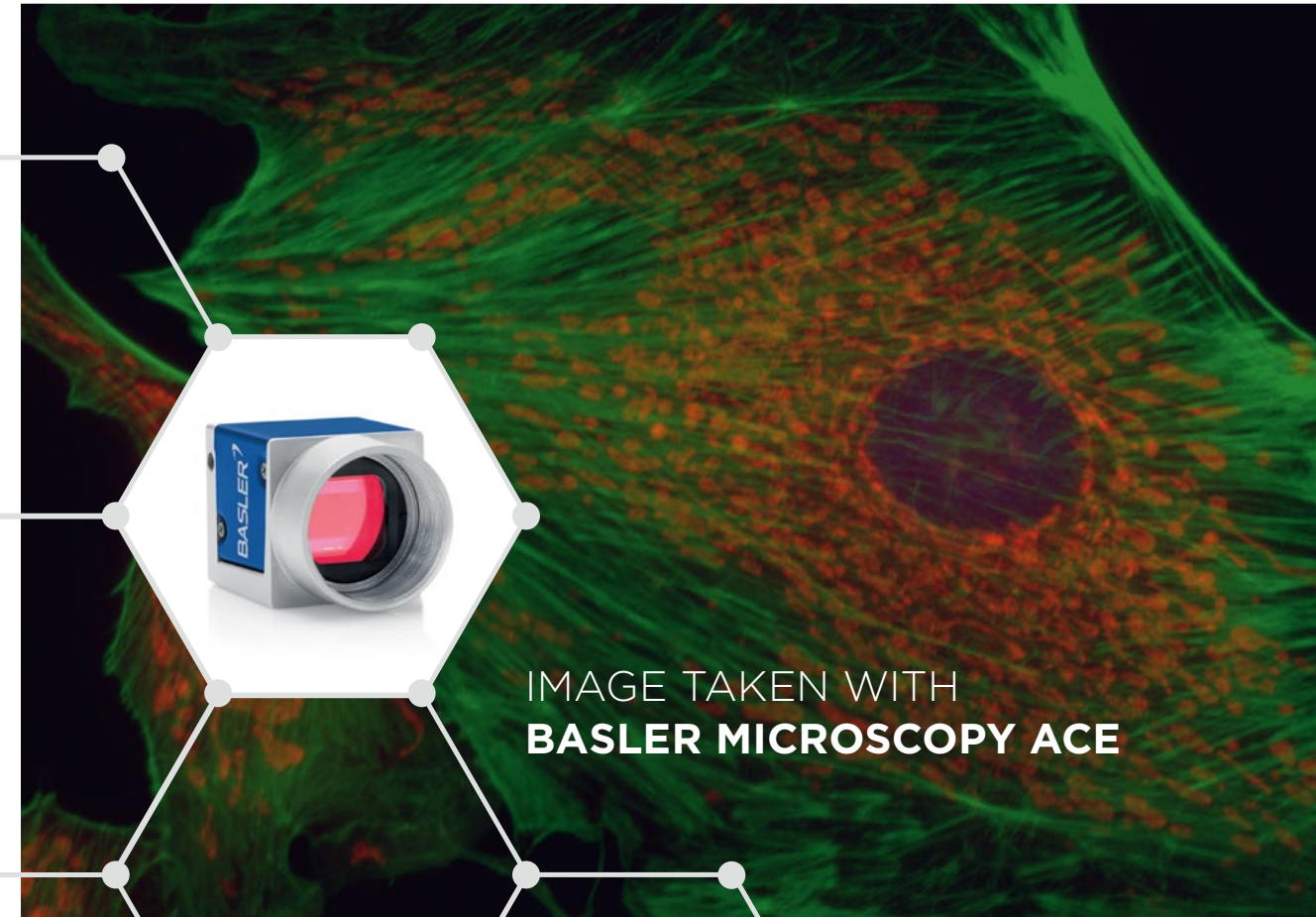
### Your Selection Of Basler Microscopy Cameras

Basler offers two cameras which are particularly suitable: The Microscopy ace 2.3 MP Mono offers the highest sensitivity thanks to its very large pixel size. Combine that with high resolution, and the Basler cameras compete well with many scientific cameras. Basler's Microscopy ace 5.1 MP Mono scores with best

balance between high resolution, large pixel size and lowest noise level. Find more camera specifications on page 9 and 10.

An important factor in fluorescence applications is the use of low light emissions, to reduce the risk of photo bleaching the sample. The Basler Microscopy Cameras provide high quantum efficiency and high sensitivity to take high-quality images even in low light. Besides high frame rates, both cameras also deliver a high dynamic range that is required for recording high differentiation between the subject and the background.

Depending on the requirements of the application, and if a colored image is needed, Basler's microscopy color cameras can also be used for fluorescence imaging. However, monochrome cameras always deliver more accuracy and are recommended.



## FLUORESCENCE IMAGING

### Advanced Software Features for Your Convenience

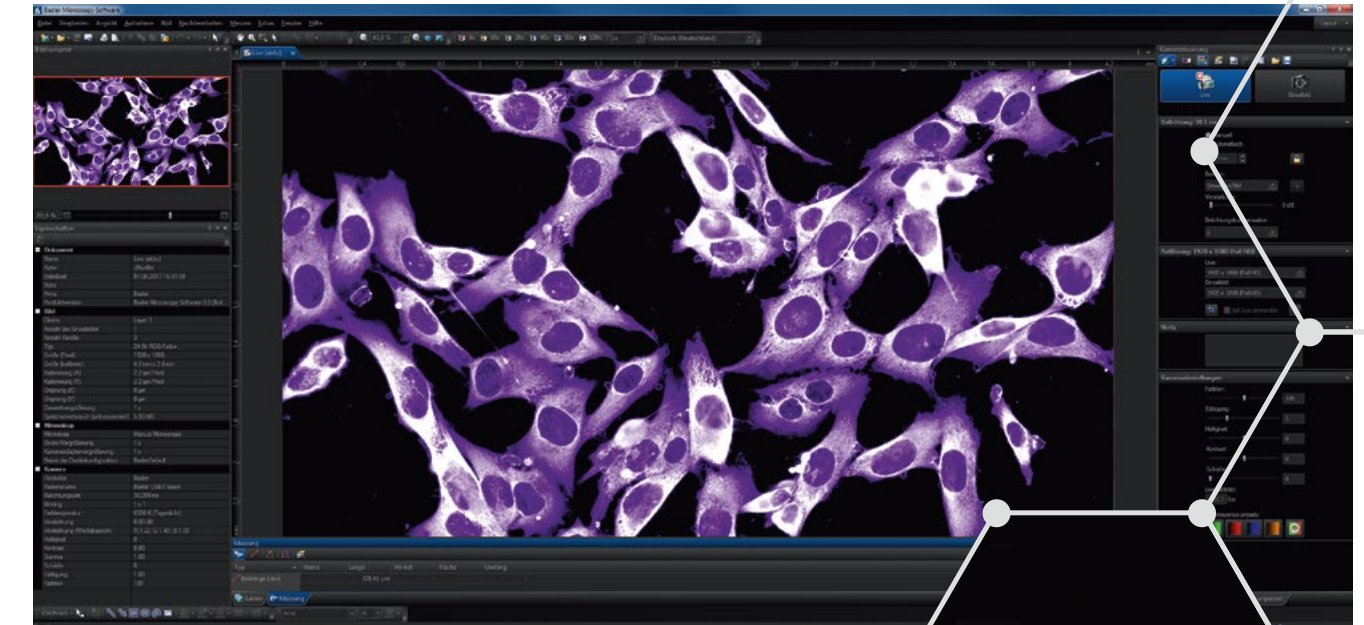
Basler does not only offer the best-suited cameras for fluorescence applications. The Basler Microscopy Software included in your PowerPack also considers the professional workers using the equipment:

#### Dark Skin Mode

The graphical user interface can be switched to a dark skin mode to reduce the light emissions from the display towards the sample. This feature also reduces the user eye fatigue and stress when working in a dark environment.

#### Fluorescence Color Presets

To make fluorescence imaging more convenient and to save the user's valuable time, Basler has integrated color presets for the most common fluorescence markers. For a quick access, these presets are placed right below the camera settings and can be activated with one click. As standard settings, these presets are available in green, red, blue and orange. However, users can also configure them to their own requirements and redefine the divisions of the color gradient. Images with this pseudo coloring feature can remain as a greyscale image for further processing in other applications, or they can be saved as a color images as they appear in the software window.



DARK SKIN MODE AND  
COLOR PRESET WITHIN  
BASLER'S MICROSCOPY SOFTWARE







## Benefits and Highlights

The Basler Microscopy Software is another centerpiece of the PowerPack. Camera and software are well matched for camera control, image acquisition, processing and analysis. Explore the benefits of this software as an ideal solution for monitoring, documentation and archiving in educational and routine research and industrial settings.

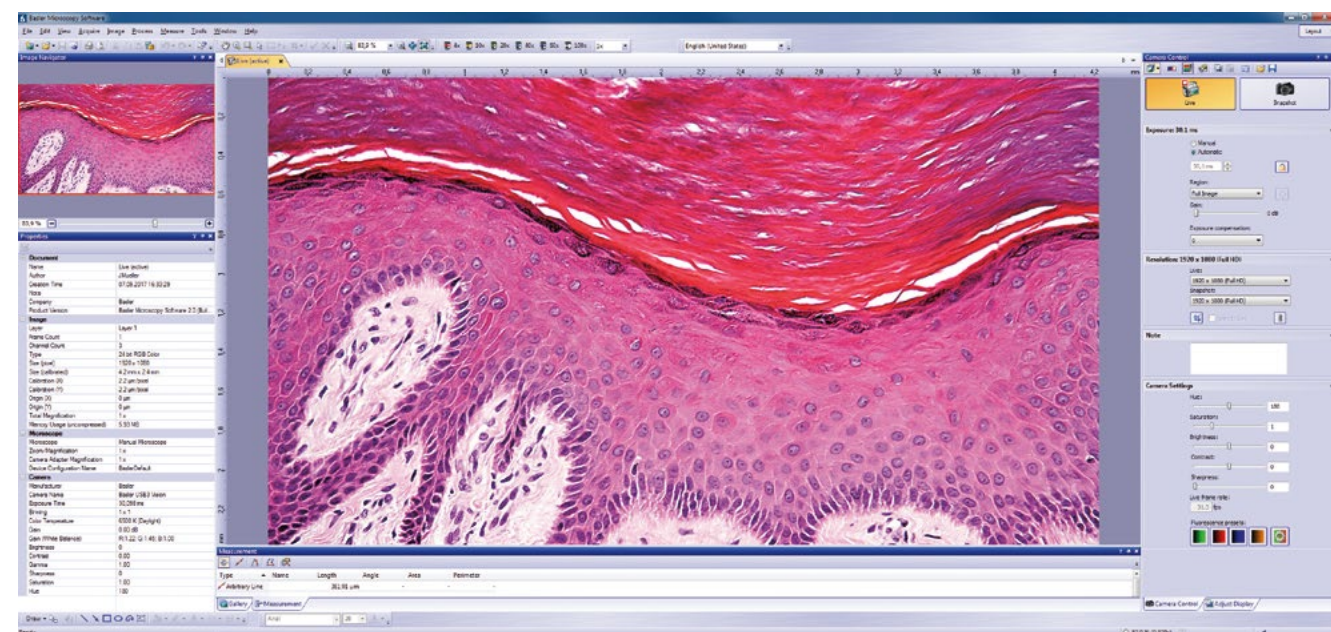
### Comprehensive software features

- Hue, saturation, brightness, contrast, gamma and gain controls
- Calibration, measurement and annotations
- Focus enhancement and automatic/manual exposure
- Exposure compensation for adjustment of the target brightness
- Selected light presets and white balance
- Unique sharpness algorithm for depth of focus
- Pseudo-coloring with Top-GUI fluorescence presets
- Support of zoom levels for stereomicroscopes

### Easiest installation and usability

- Intuitive and customizable user interface with real-time live view
- Easy image acquisition and standard image processing
- Dark skin interface for less light emission and relaxed user eyes for fluorescence applications
- Comprehensive help tool
- Multilingual user interface (English, French, Italian, German, Japanese, Chinese, Russian)
- Supported operating systems: Windows 7, Windows 8.1, Windows 10 – 32 bit and 64 bit
- Save and restore camera settings

You need an imaging solution for more demanding microscopy applications in life science, materials science, biomedical or industrial research? Benefit from advanced software features, such as calibration, measurement, annotation or pseudo-coloring. Hue, saturation, brightness, contrast, gamma and gain controls provide advanced image enhancement and color adjustment options to achieve exceptional color reproduction. The software can easily be customized to best fit your workflow. Download the software on our website: [www.baslerweb.com/MicroscopySoftware](http://www.baslerweb.com/MicroscopySoftware)



## Benefits and Highlights

The Basler Video Recording Software comes with your Basler Microscopy PowerPack, but also works with all Basler USB 3.0 cameras. Besides capturing single images, the software makes it easy to record videos as well as image sequences for time-lapse microscopy.

### Comprehensive software features

- Live view and camera control
- Videos in modern MPEG-4 format
- High-speed videos for slow-motion analysis
- Capturing image and video sequences for time-lapse microscopy

### Easiest installation and usability

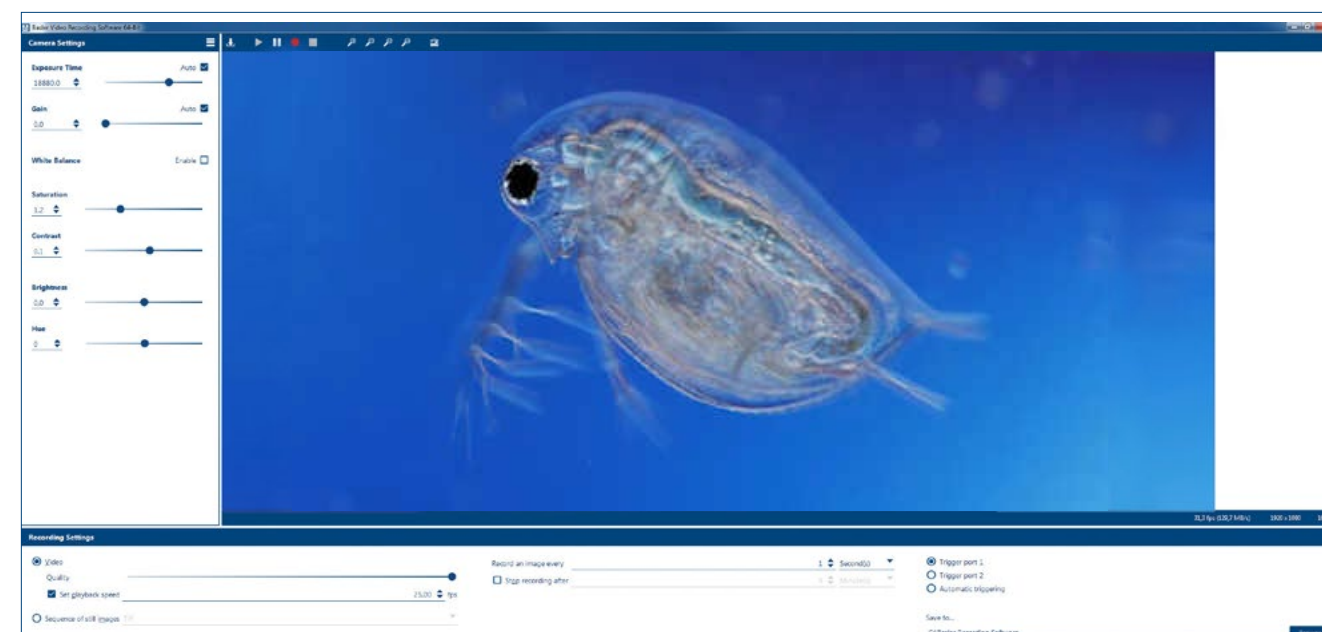
- Image adjustments and automated settings
- Supported operating systems: Windows 7, Windows 8.1, Windows 10 – 32 bit and 64 bit
- Intuitive interface design for ease of use
- Image capturing with hardware trigger signal

The Basler Video Recording Software enables you to capture slow-motion videos. Such recordings are useful for motion analysis where fast-moving objects need to be investigated. This is particularly crucial in applications like material analysis, sperm analysis or for monitoring cell transportation processes.

The software offers two options for time-lapse microscopy: Take uncompressed image sequences for further analysis and processing, or capture time-lapse videos for monitoring processes and changes in samples as well as for publications. The time interval for both images and video can be set to your needs, as well as automated start and stop of the recording.

When using a Basler Microscopy ace camera, the software even takes images or videos automatically when using hardware trigger signals. This comes in handy for many use cases and can, for example, support hands-free documentation during material inspection.

Download the Basler Video Recording Software now on our website to run it with your Basler Microscopy Camera or other Basler USB 3.0 cameras: [www.baslerweb.com/RecordingSoftware](http://www.baslerweb.com/RecordingSoftware)





# WHY BASLER

## Quality made in Germany – made by Basler

Our approach to quality assurance is rigorous: We constantly audit all facets of our business to ensure powerful performance, to increase efficiency and to reduce costs for our customers. We comply with quality standards including ISO 9001, CE, UL, RoHS, and more.

We employ several quality inspection procedures during manufacturing. Every Basler camera is subjected to exhaustive optical, electrical and mechanical tests before leaving the factory. Regardless of what technology or camera model you choose, you can be assured of consistent performance.

Basler is leading the effort to standardize image quality and sensitivity measurement for cameras and sensors. Our cameras are designed and measured in 100% compliance with the EMVA 1288 standard. Basler's reputation for quality speaks for itself and will meet your highest expectations.

## Discover Basler

For more information about Basler's offering for your individual microscopy application please visit: [www.baslerweb.com/microscopy](http://www.baslerweb.com/microscopy)

Or stay in touch through our social media channels:



You can also find tutorial videos for the Basler PowerPack on our YouTube channel: [www.youtube.com/BaslerAG](http://www.youtube.com/BaslerAG)

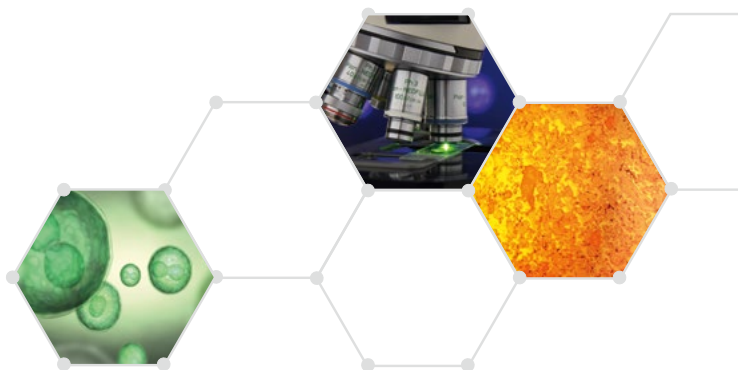
## About Basler

Basler is a leading manufacturer of high-quality digital cameras and accessories for industry, medicine, traffic and a variety of other markets. The company's product portfolio encompasses area scan and line scan cameras in compact housing dimensions, camera modules in board level variants for embedded solutions, and 3D cameras. The catalog is rounded off by our user-friendly pylon SDK and a broad spectrum of accessories, including a number developed specially for Basler and optimally harmonized for our cameras.

Basler has 30 years of experience in computer vision. The company is home to approximately 500 employees at its headquarters in Ahrensburg, Germany, and its subsidiaries and sales offices in Europe, Asia, and North America.

## 3-Year Warranty

Basler offers a 3-year warranty for their cameras and Basler Lenses. We continually reinvest in research, development and superior manufacturing capabilities so that our customers can fully rely on the products we manufacture.



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