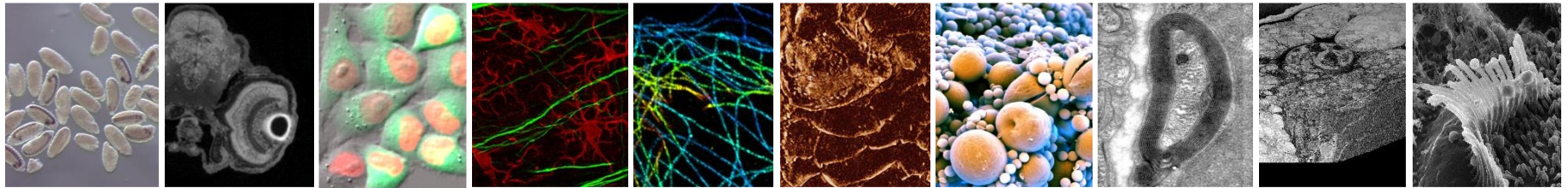


ZEISS Microscopy



A complete microscopy portfolio...



Stereo
LM

Sub-micron
XRM

Widefield
LM

Confocal
LM

Super
resolution
LM

Nanoscale
XRM

C-SEM

FE-SEM

FIB-SEM

Helium Ion
Microscope

1 μ m

700 nm

250 nm

200 nm

20 nm

< 50 nm

< 2 nm

< 1 nm

< 1 nm

< 0.5 nm

Pavel Krist

...for multi-dimensional research challenges

Carl Zeiss, spol. s r.o. Česká Republika
pavel.krist@zeiss.com

CARL ZEISS - history



Carl Zeiss (1816–1888)

Precision mechanic

Founder of the company Carl Zeiss

1846 Carl Zeiss founded a workshop for precision mechanics and optics in Jena

1847 Production of simple microscopes.

1875 Scientific employee Ernst Abbe made part owner.

1860/63 Appointed university and court mechanic.

1880 Awarded Dr. phil. honoris causa by the University of Jena.



CARL ZEISS - history



Ernst Abbe (1840–1905)

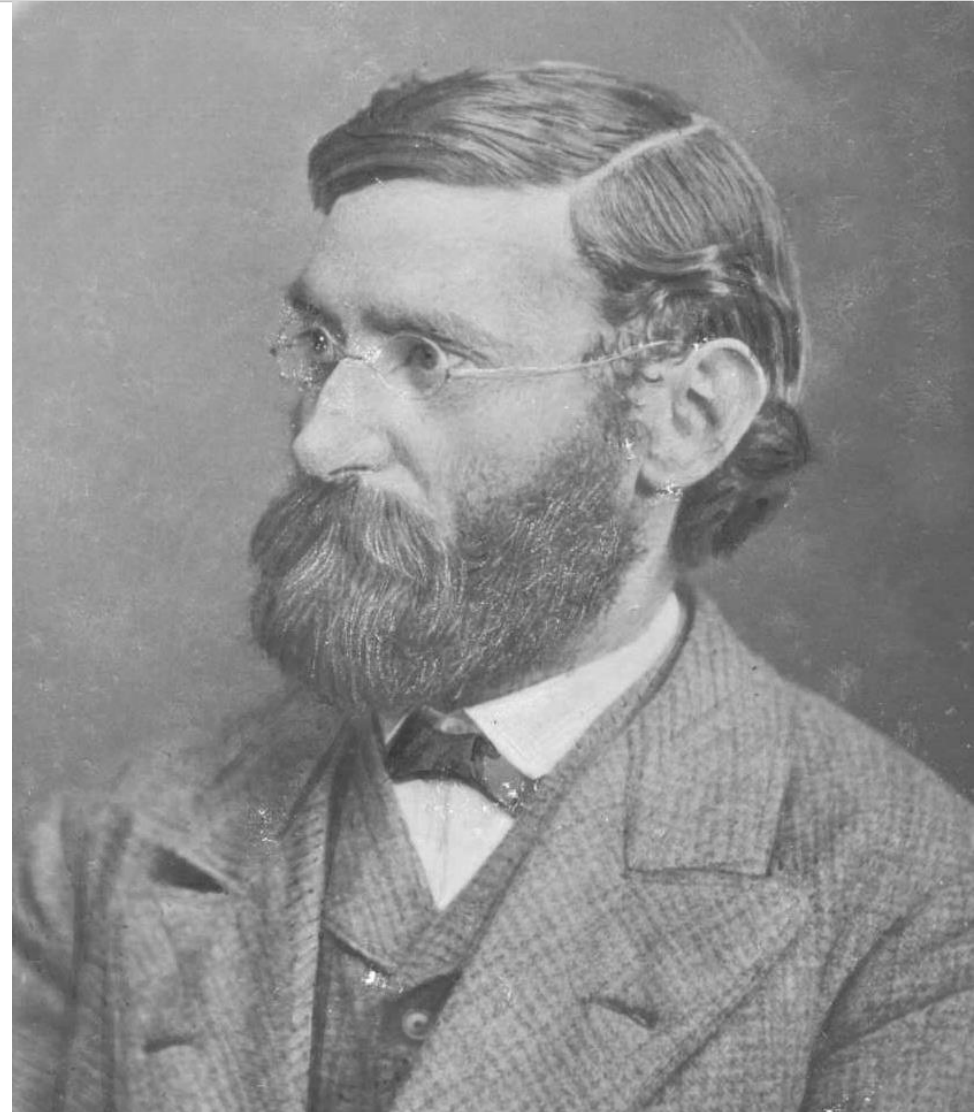
Physicist, scientist, entrepreneur, social reformer, founder of the Carl Zeiss Stiftung (Carl Zeiss Foundation)

1863 Private lecturer at the University of Jena

1866 Began working with Carl Zeiss. Laid the foundation of modern optics with Carl Zeiss and later with Otto Schott.

1870 – 1896 Professor of physics at the University of Jena. He and his students shaped modern precision mechanics and optics.

1889 Founded the Carl Zeiss Foundation.



CARL ZEISS - history



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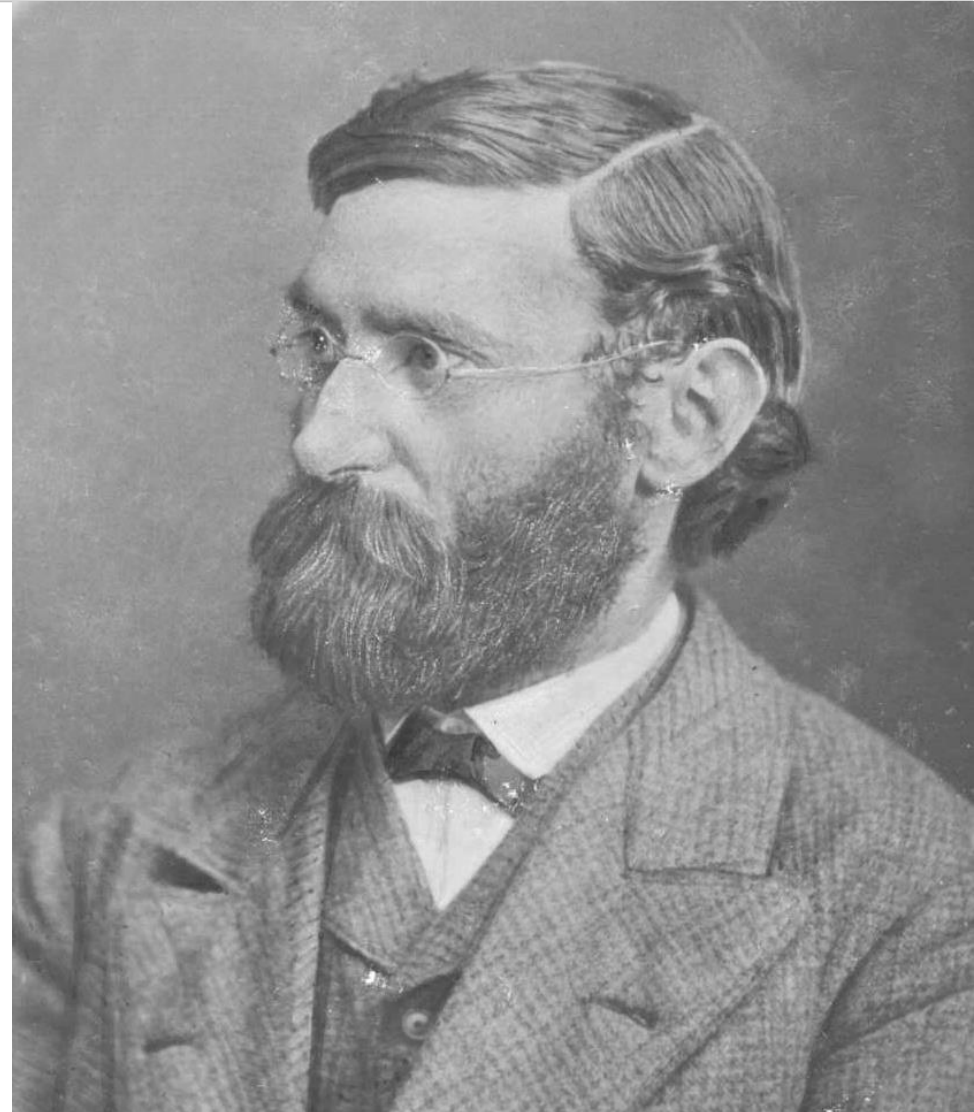
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CARL ZEISS - history



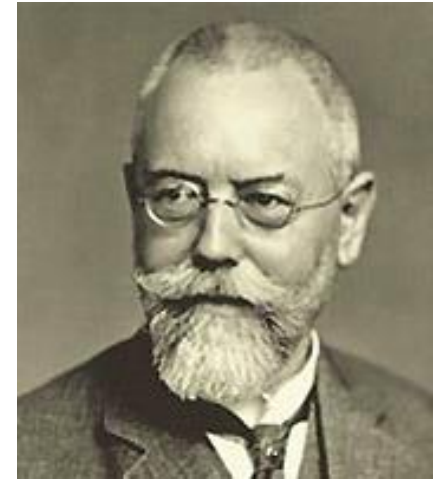
Carl Friedrich Zeiss
(1816 - 1888)



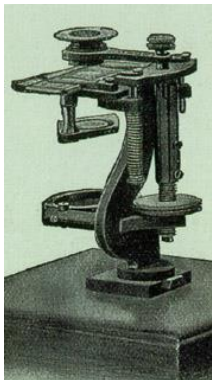
Ernst Abbe
(1840 - 1905)



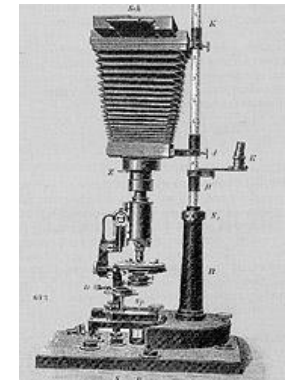
Otto Schott
(1851 - 1935)



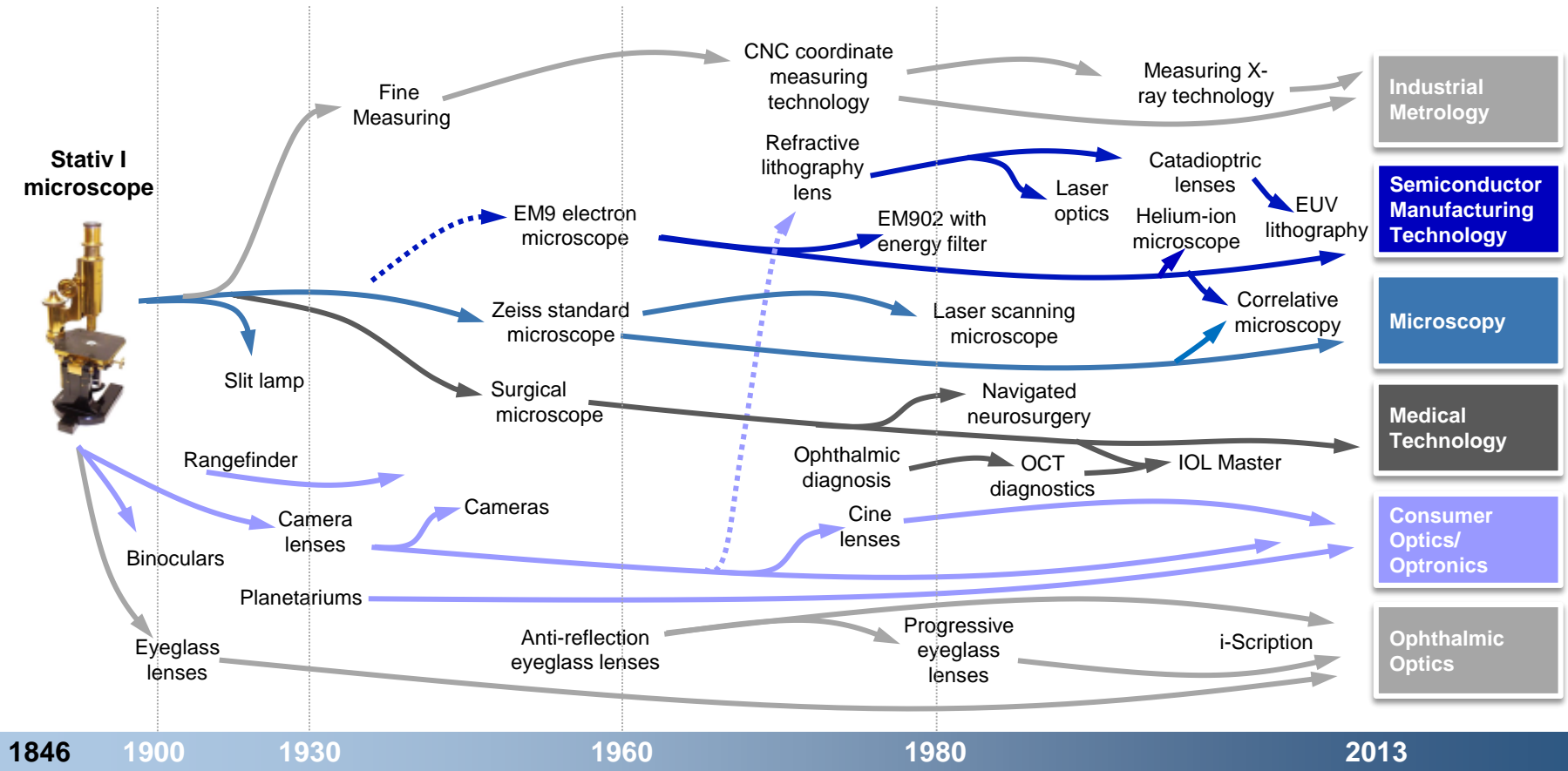
August Köhler
(1866 - 1948)



$$d = \frac{\lambda}{2n \sin \alpha}$$



ZEISS' innovative power repeatedly delivered trend-setting products over the last 174 years...



Four Future-Shaping Segments



Semiconductor Manufacturing Technology



Industrial Quality & Research

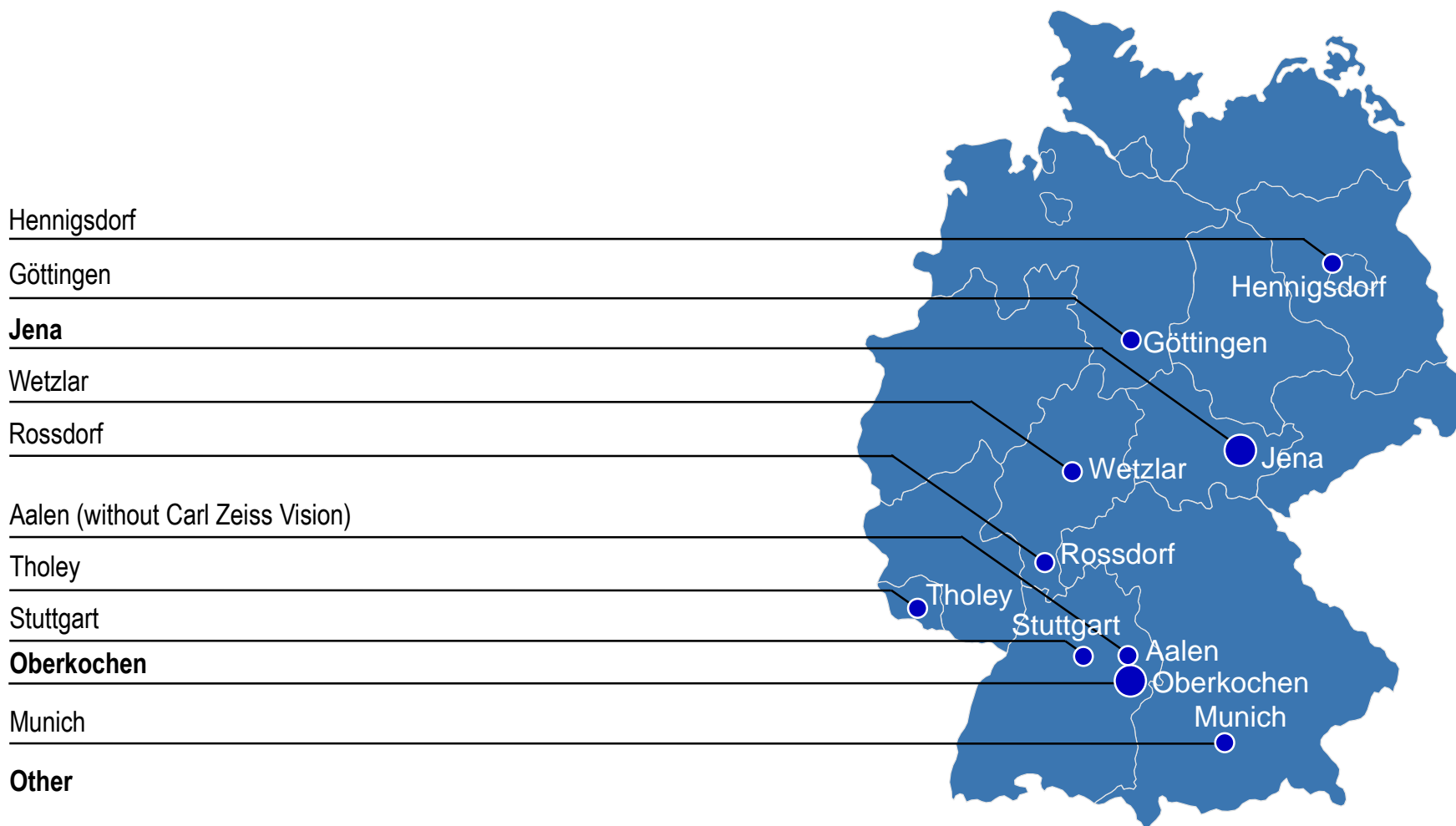


Medical Technology



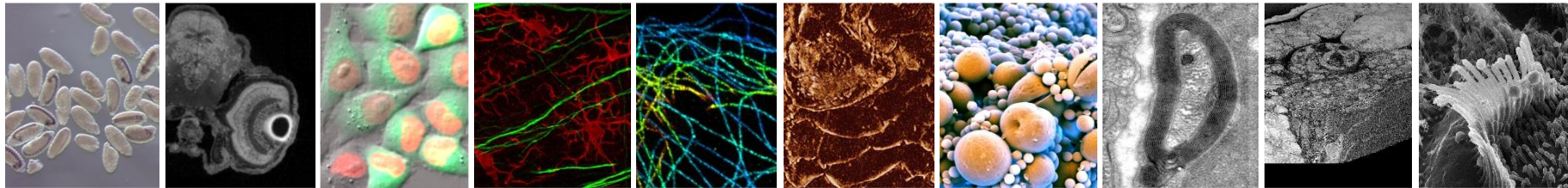
Consumer Markets

CARL ZEISS - Germany



* Consolidated companies, all figures rounded

A complete microscopy portfolio...

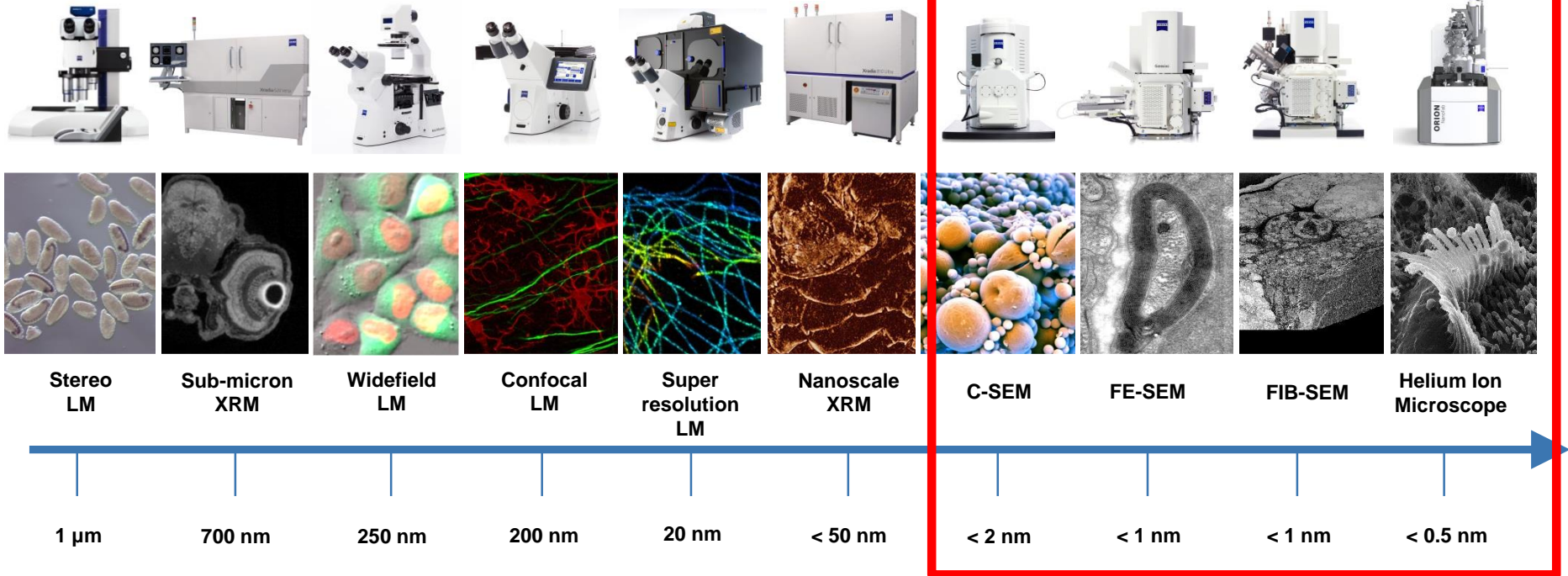


Stereo LM Sub-micron XRM Widefield LM Confocal LM Super resolution LM Nanoscale XRM C-SEM FE-SEM FIB-SEM Helium Ion Microscope

1 μ m 700 nm 250 nm 200 nm 20 nm < 50 nm < 2 nm < 1 nm < 1 nm < 0.5 nm

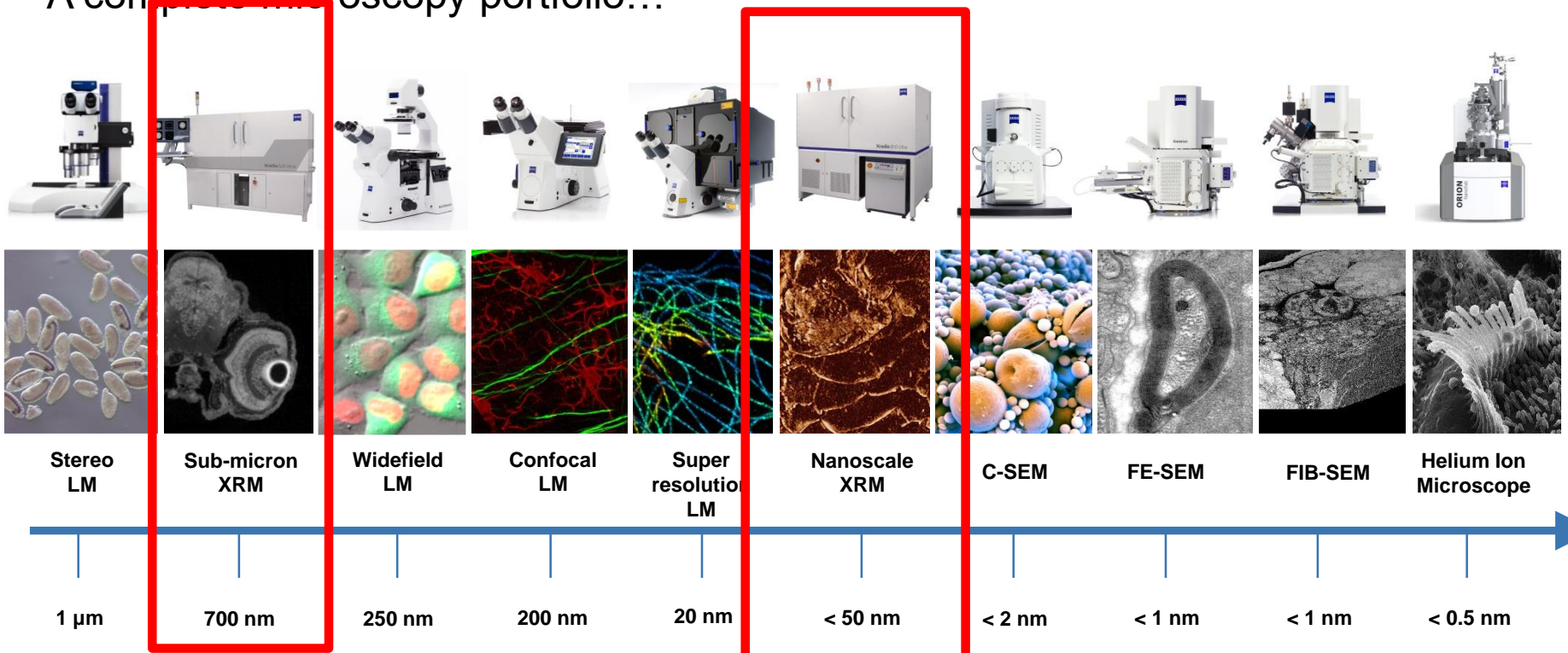
...for multi-dimensional research challenges

A complete microscopy portfolio...



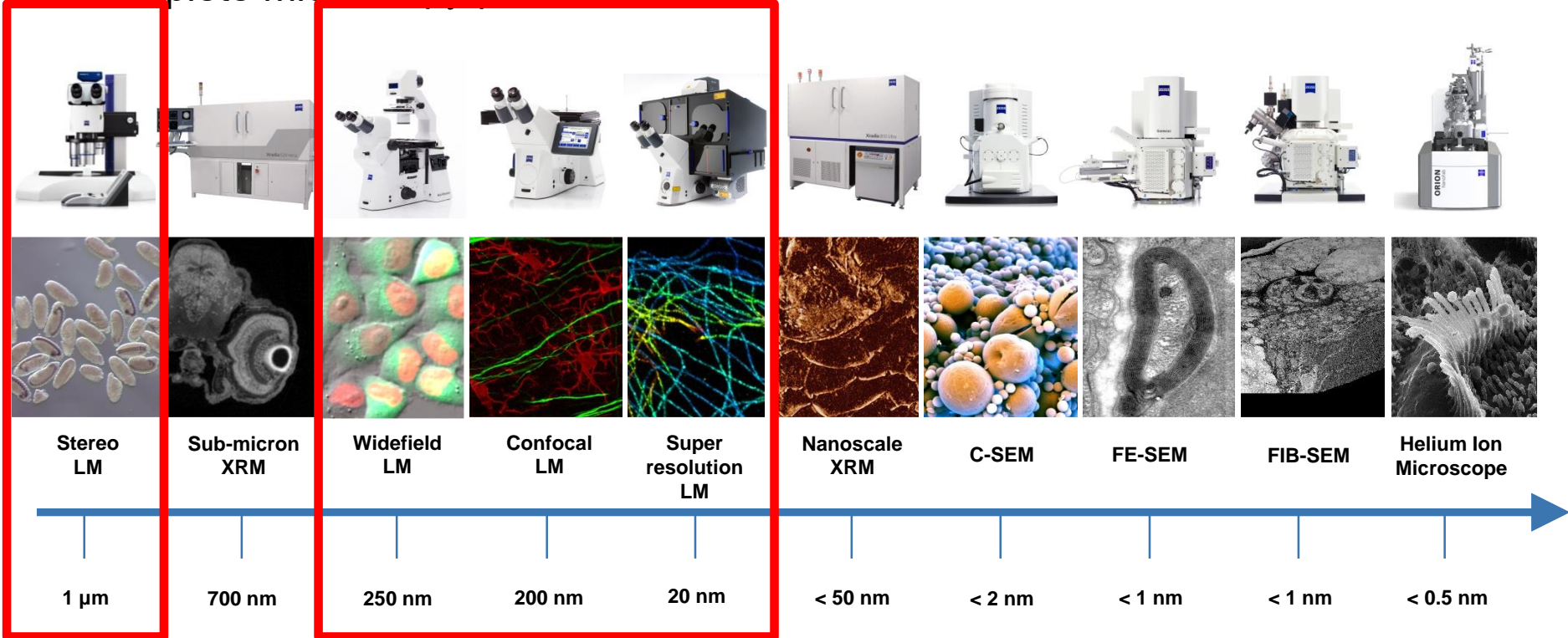
...for multi-dimensional research challenges

A complete microscopy portfolio...



...for multi-dimensional research challenges

A complete microscopy portfolio...



...for multi-dimensional research challenges

- Upright microscopes – PrimoStar, AxioScope, AxioImager
- Electrophysiology microscopes – AxioExaminer
- Inverted microscopes – PrimoVert, AxioVert, AxioObserver
- Stereomicroscopes – Stemi, SteREO Discovery
- Zoom microscopes – AxioZoom.V16
- Confocal microscopes – Airyscan, LSM 980, 900, 980 NLO
- Superresolution – ELYRA.7
- Imaging systems – Lightsheet.Z1, Spinning Disc, Apotome.2, Celldiscoverer.7
- Laser microdissection – PALM Microbeam, Microtweezers, Combi system
- Electron microscopy – GeminiSEM, Sigma, MultiSEM, Merlin, EVO, Crossbeam, Orion
- Spectrometers

Microscopy overview



YOU HAVE THE CHOICE = USE IT!!!

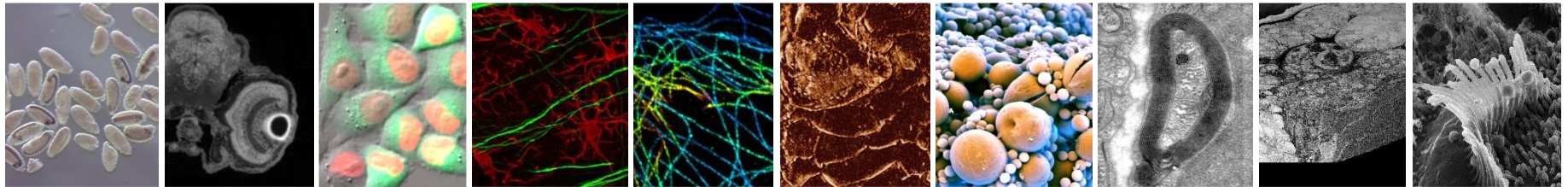
ONLY WITH



We make it visible.

- Upright microscopes – PrimoStar, AxioScope, AxioImager
- Electrophysiology microscopes – AxioExaminer
- Inverted microscopes – PrimoVert, AxioVert, AxioObserver
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A complete microscopy portfolio...



Stereo LM **Sub-micron XRM** **Widefield LM** **Confocal LM** **Super resolution LM** **Nanoscale XRM** **C-SEM** **FE-SEM** **FIB-SEM** **Helium Ion Microscope**

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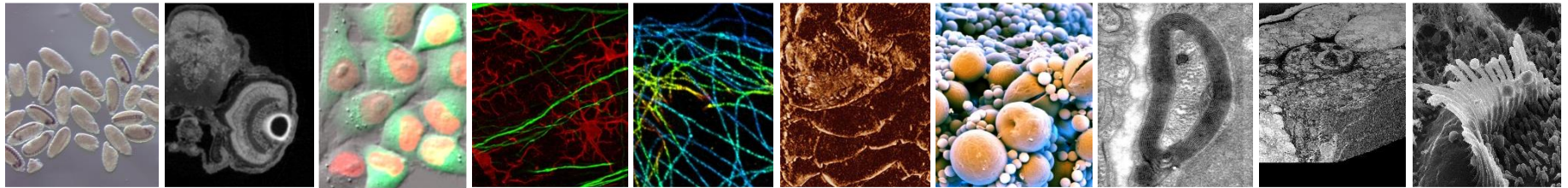
...for multi-dimensional research challenges

Correlative microscopy

Vodohospodáři?



A complete microscopy portfolio...



Stereo LM **Sub-micron XRM** **Widefield LM** **Confocal LM** **Super resolution LM** **Nanoscale XRM** **C-SEM** **FE-SEM** **FIB-SEM** **Helium Ion Microscope**

1 μ m 700 nm 250 nm 200 nm 20 nm < 50 nm < 2 nm < 1 nm < 1 nm < 0.5 nm

...for multi-dimensional research challenges

Vodohospodáři?



ZEISS AxioLab 5

- high-end optics
- ergonomics
- full camera integration
- objective coding (automatic scalebar)
- 3 channel LED fluorescence



Vodohospodáři?



ZEISS AxioScope 5

- high-end optics
- ergonomics
- full camera integration
- objective coding (automatic scalebar)
- more hardware options
- 3 / 5 channel LED fluorescence

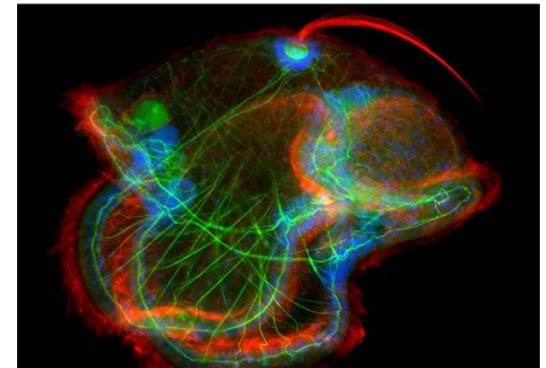
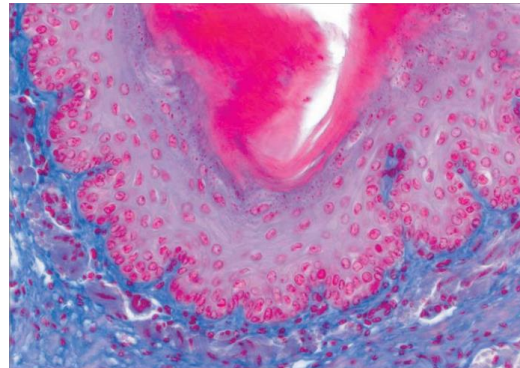
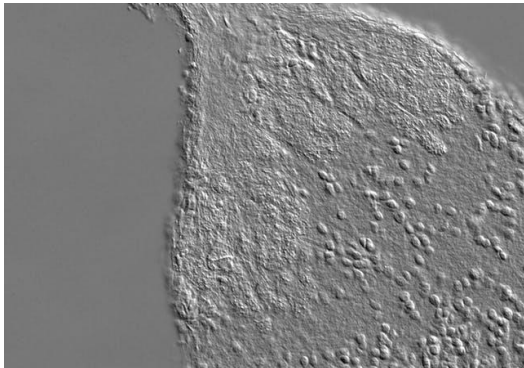


Vodohospodáři?



ZEISS Axiolmager

- high-end optics
- motorization
- ergonomics
- complete hardware coding
- more hardware options
- up to 10 channel fluorescence
- incl. optical sectioning

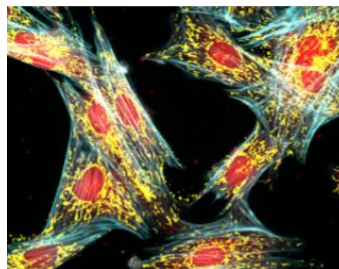
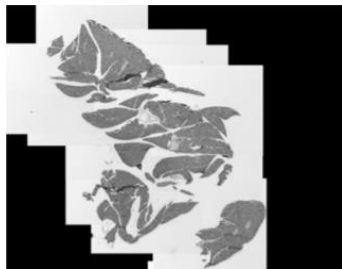
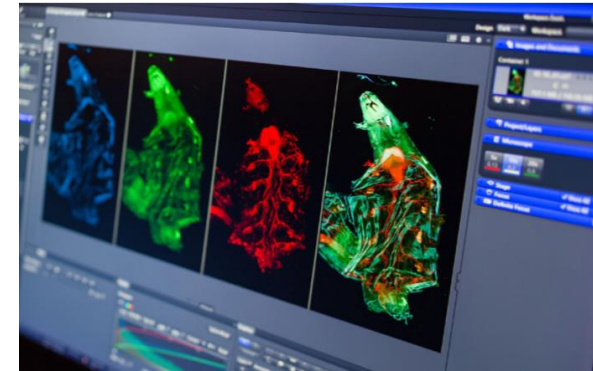


Vodohospodáři?



ZEISS ZEN software

- FREE ZEN Lite comes with camera
- Motorized systems – paid version
- Camera handling
- Microscope handling
- Image processing
 - incl. Fluorescence Multichannel, Extended Depth of Focus, Panorama, etc.
 - incl. Measurements etc.
 - incl. Deconvolution, Deblurring, etc.
- Image Analysis
- Machine Learning Image Analysis
- Bioformat = compatibility with FIJI, ImageJ, etc.

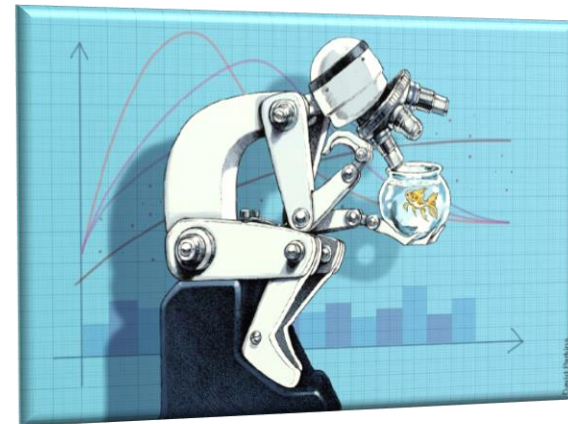


Vodohospodáři?



ZEISS Celldiscoverer

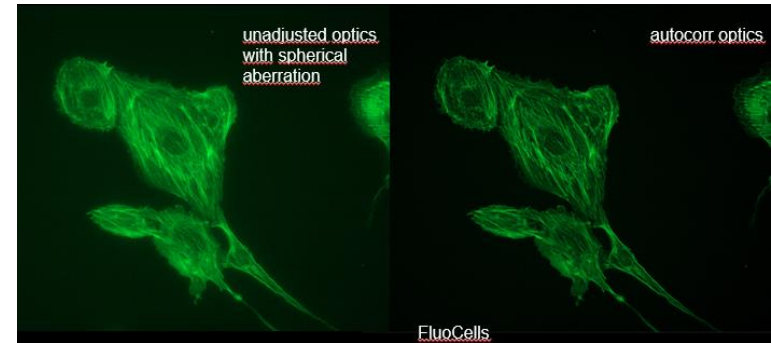
- special high-end optics
- motorization
- automatization
- more hardware options
- incl. optical sectioning



Automation



Adaptive LensGuard
AutoCorr objectives
Autoimmersion (H₂O)

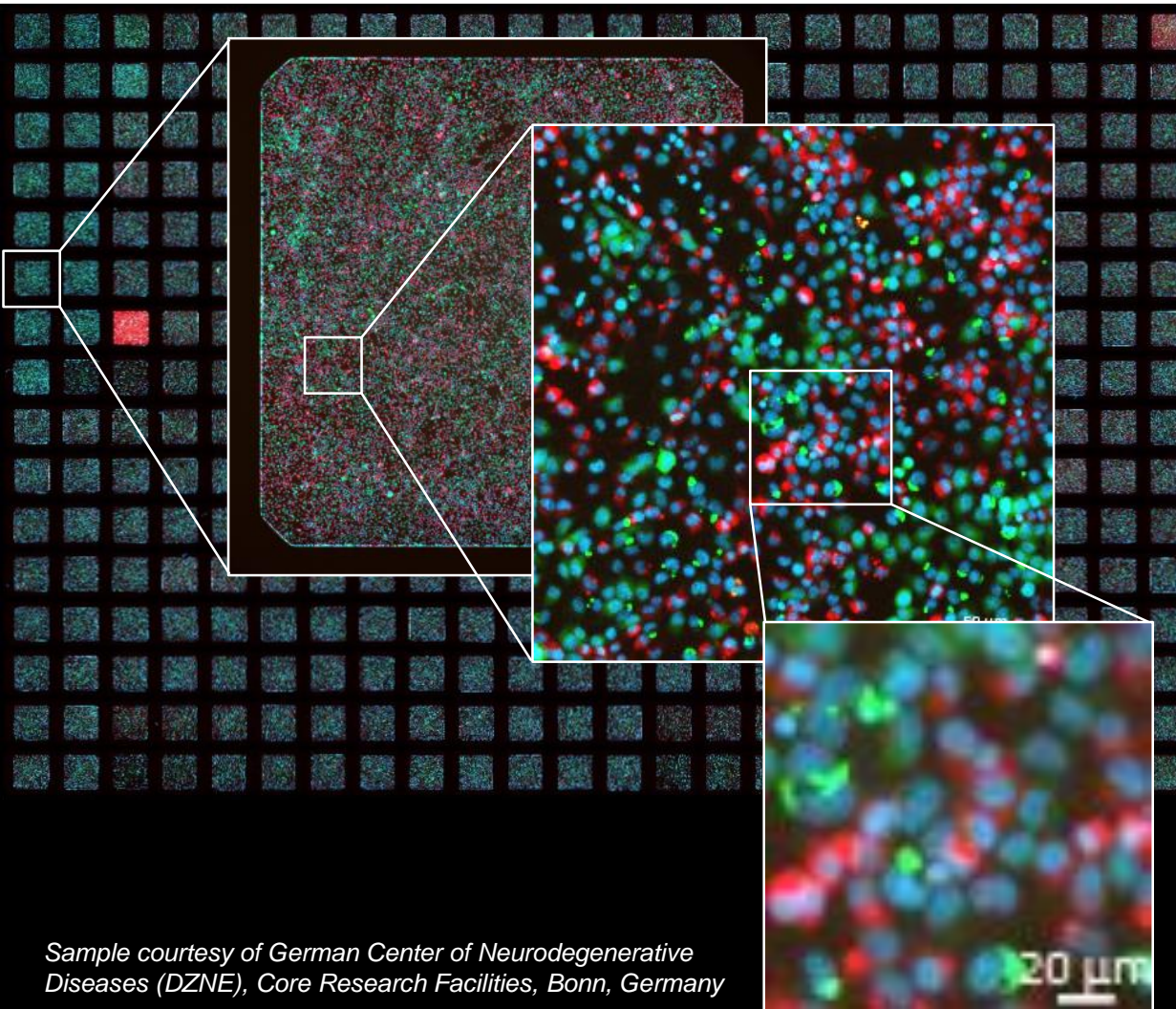


5,1 mm	2,2 mm	0,76 mm	Water immersion 0,84 mm
Triple X	Triple X	Triple X	Triple X
Plan-APOCHROMAT	Plan-APOCHROMAT	Plan-APOCHROMAT	Plan-APOCHROMAT
2,5x/0,12 5x/0,25 10x/0,35	10x/0,35 20x/0,7 40x/0,7	10x/0,5 20x/0,8 40x/0,95	25x/1,2 50x/1,2 100x/1,2
FOV up to 4.4 mm	FOV up to 1.1 mm	FOV up to 1.1 mm	FOV up to 0.44 mm
Single Shot Full Well Imaging High Throughput	Thick Plastic Bottom High Quality Imaging	The Benchmark Dry Lens	Highest Sensitivity & Resolution for LCI



Large Field of View with High Resolution

One Shot per Well for High Throughput



- A 384 microwell plate, three color staining
- Every well fits into one single image
- Total imaging time: <12 min
- Delivering unparalleled information density

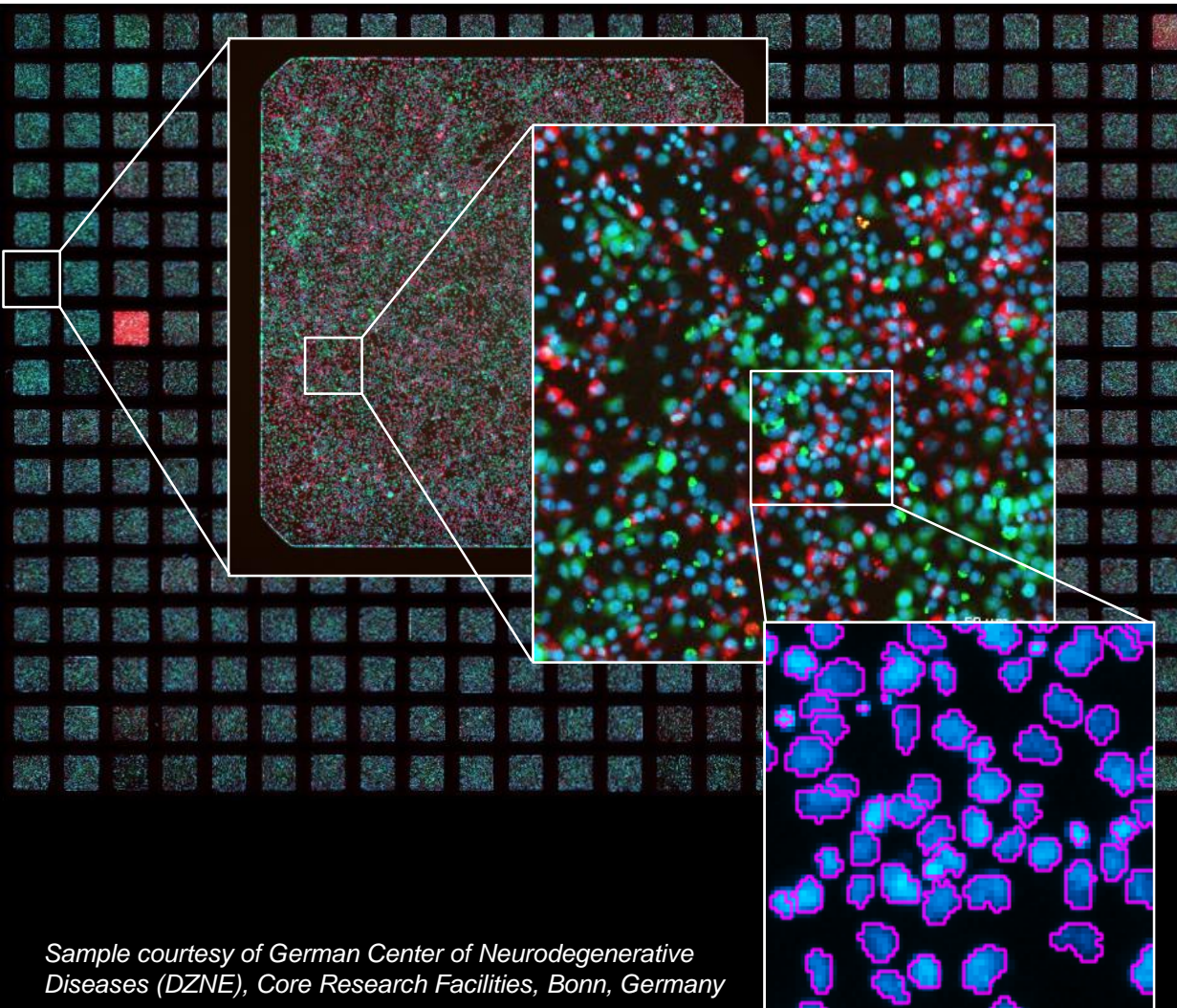
Sample courtesy of German Center of Neurodegenerative Diseases (DZNE), Core Research Facilities, Bonn, Germany



2,5x / 0,12
5x / 0,25
10x / 0,35

Large Field of View with High Resolution

One Shot per Well for High Throughput



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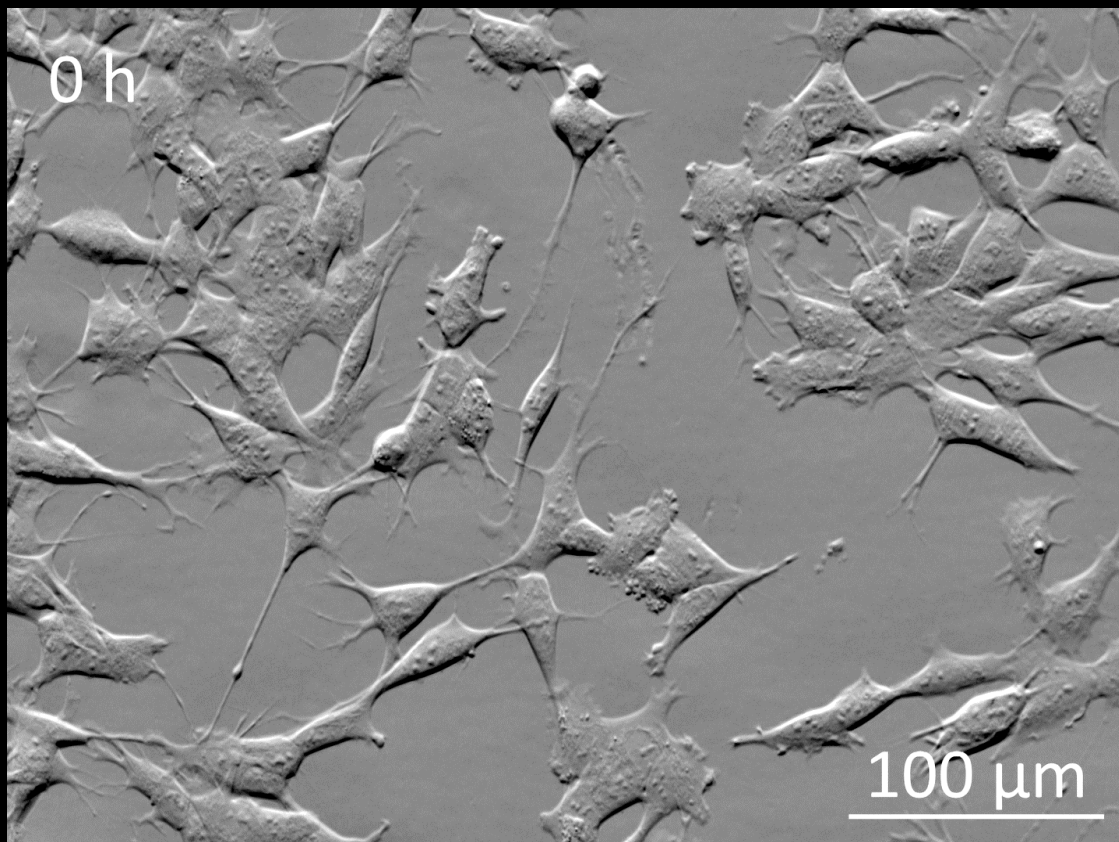
Sample courtesy of German Center of Neurodegenerative Diseases (DZNE), Core Research Facilities, Bonn, Germany



2,5x / 0,12
5x / 0,25
10x / 0,35

Fast and Gentle Light Engine

Image Label Free with Phase Gradient Contrast



- Label free growth assays
- Gentle IR LED
- 14 hour timelapse using adaptive phase gradient contrast

Sample of P. Denner, Core Research Facilities, German Center of Neurodegenerative Diseases (DZNE), Bonn, Germany



10x/0,5
20x/0,8
40x/0,95

Phase Gradient Contrast

Full glass/Plastic compatibility and full well coverage

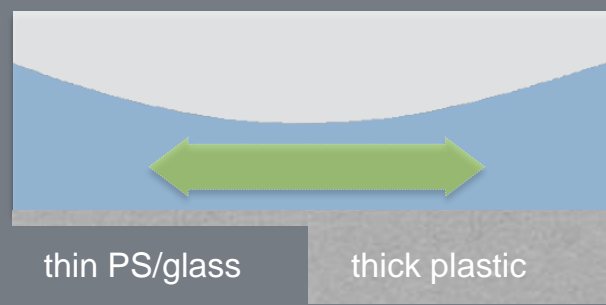


Adaptive Phase Gradient Contrast



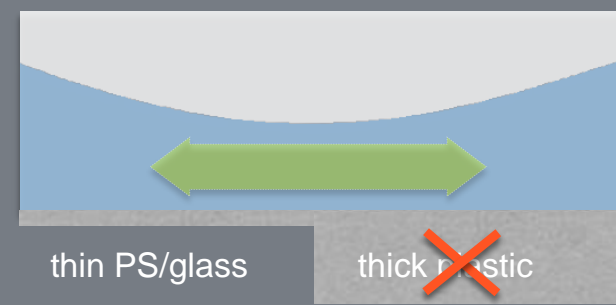
Full compatibility
Full well coverage

Phase Contrast



Full compatibility,
but **only partial** well
coverage

Differential Interference Contrast



Partial compatibility,
and **only partial** well
coverage

ZEN – Open Application Development (OAD)

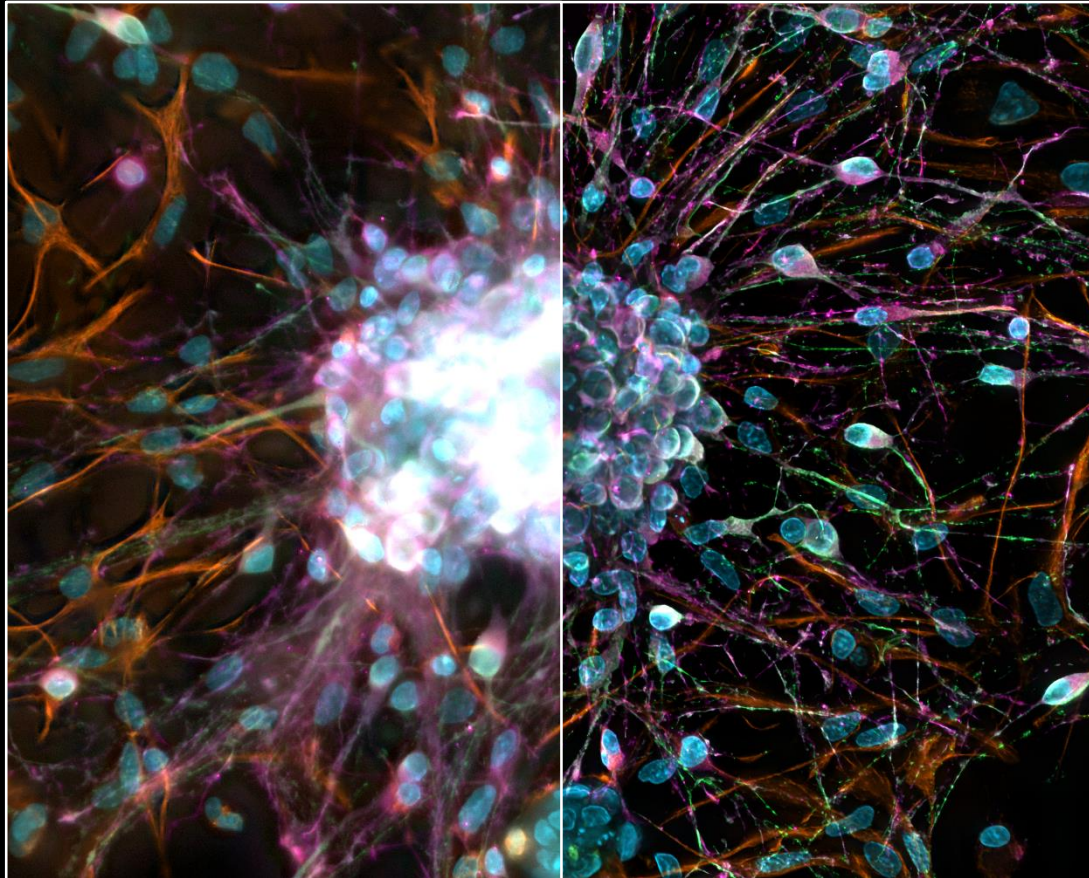
Powerful Yet Open



- **Use many platforms for your individual image analysis**
- **Use Python scripts, e.g. for rare event detection, to customize and automate your workflows**
- Exchange data with external software packages
- Integrate external image analysis applications into your workflows
- Use feedback functions for smarter and dynamic experiments

Team Quality Imaging with Deconvolution

GPU-based Deconvolution for fast 3D data processing



- Rat Cortical primary culture
- Using 40x/0.95
- **Processed using GPU-Based Deconvolution for fast 3D imaging**
- **Up to 60x faster**



Products and Accessories

Tools

MyZeiss

Microscopes



> Upright



> Inverted



> Stereo



> Zoom

Systems



> Digital



> Confocal



> Other systems

AxioCam



> Mono

> Color

Software



> AxioVision

> ZEN

Computer



> Compact

> Premium

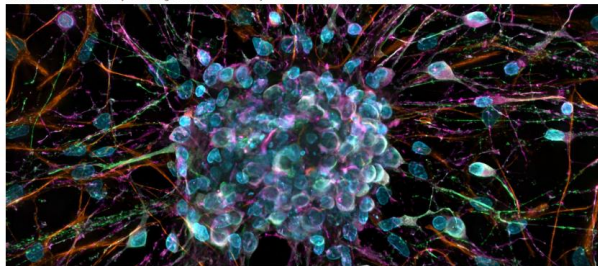
Accessories



> Select accessories

Filter Assistant

The filter assistant shows you the right combination of dyes and Carl Zeiss filter sets.



Objective Selection Search

Objective Class	Aperture	Contrast Method/Application	Optics
CP-Achromat	1.0x	B BrightField	Without immersion
A-Plan	1.25x	BD BrightField/Contrast	Water
LDA-Plan	2.5x	DIC Differential Interference Contrast	IC

for multiple selection: hold [Ctrl] / [Cmd] / [Alt] / [Option] / [Opt] down

Objective Selection by Contrast Method/Application

Phase Contrast	Phase-Contrast	DIC Contrast	Fluorescence	BrightField

Camera Assistant

Adaptation of cameras to ZEISS microscopes

The Camera Assistant supports your search for adaptors to adapt your camera to ZEISS microscopes. Please follow the instructions.

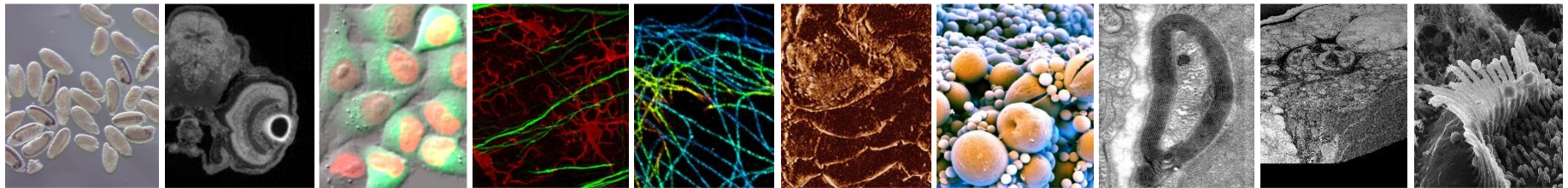
Camera Type

Digital Interchangeable Lens System Camera	Microscope Camera, Digital	Microscope Camera, video analogue 1-CCD

ZEISS Microscopy



A complete microscopy portfolio...



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Dr. Pavel Krist / Vít Tichý

...for multi-dimensional research challenges

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pavel.krist@zeiss.com / vit.tichy@zeiss.com



We make it visible.