



# Solder Paste Inspection

- *Factsheet*
- *Example Images*
- *Light Field in micro inspection*

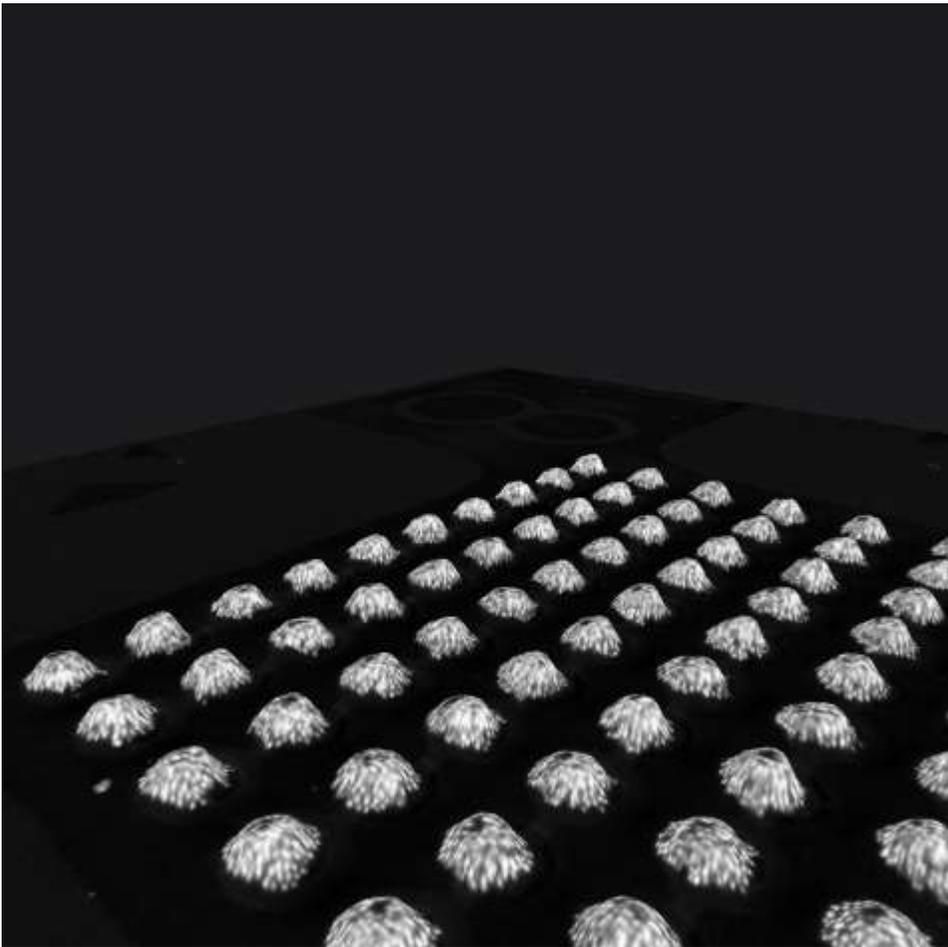


## Factsheet

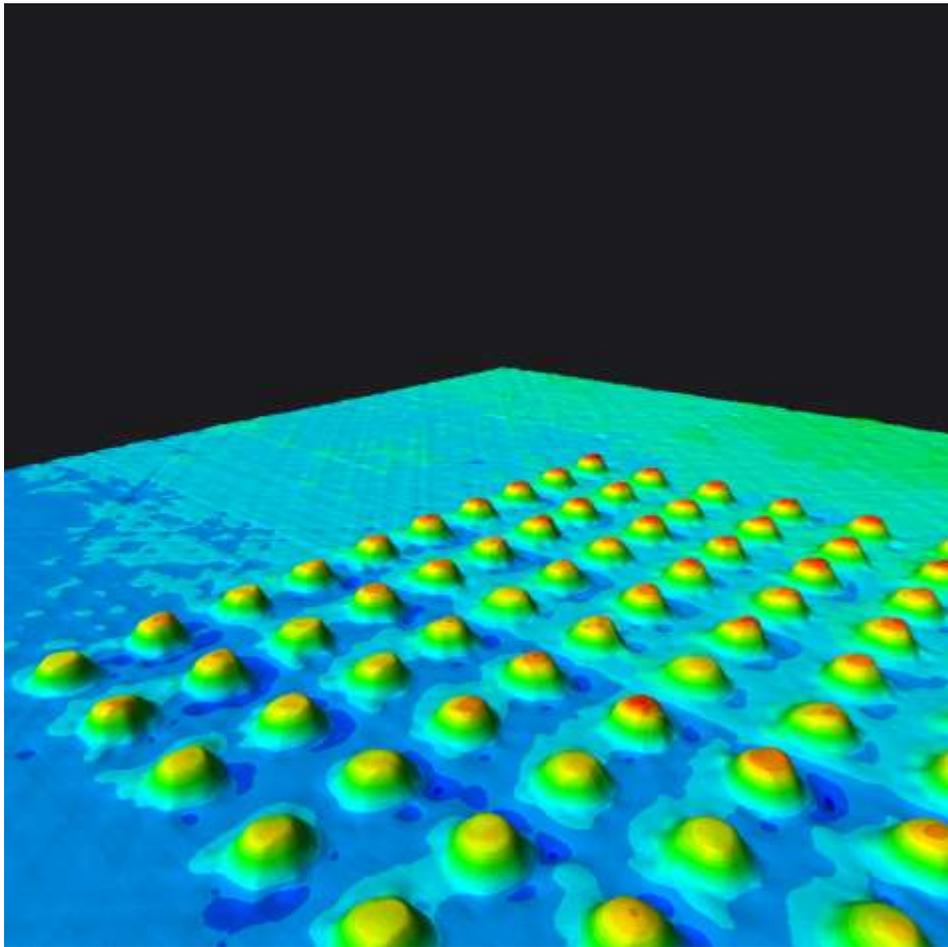
	R26 3X	R50 3X
Field of View	7.8x7.8mm	12.1x9.2mm
Lateral Resolution	3.0 $\mu$ m	3.1 $\mu$ m
Depth of Field	1.1mm	1.1mm
Depth Resolution	2.5 $\mu$ m	0.5 $\mu$ m
Working Distance	48mm	48mm
Framerate (max)	81fps	30fps

# Example Images

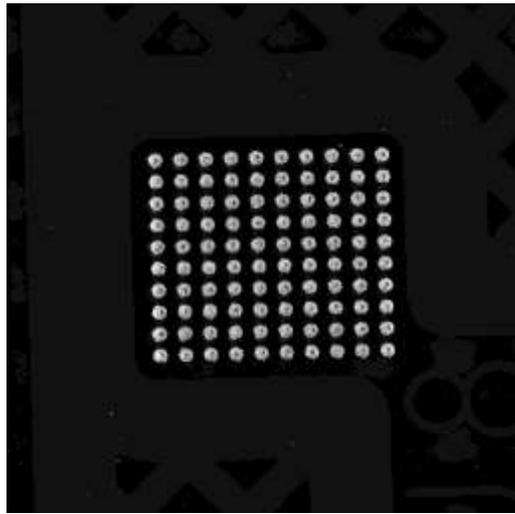
*Solder Paste, 100μm height*



3D model with 2D image as texture



3D model with false color depth map as texture



2D image

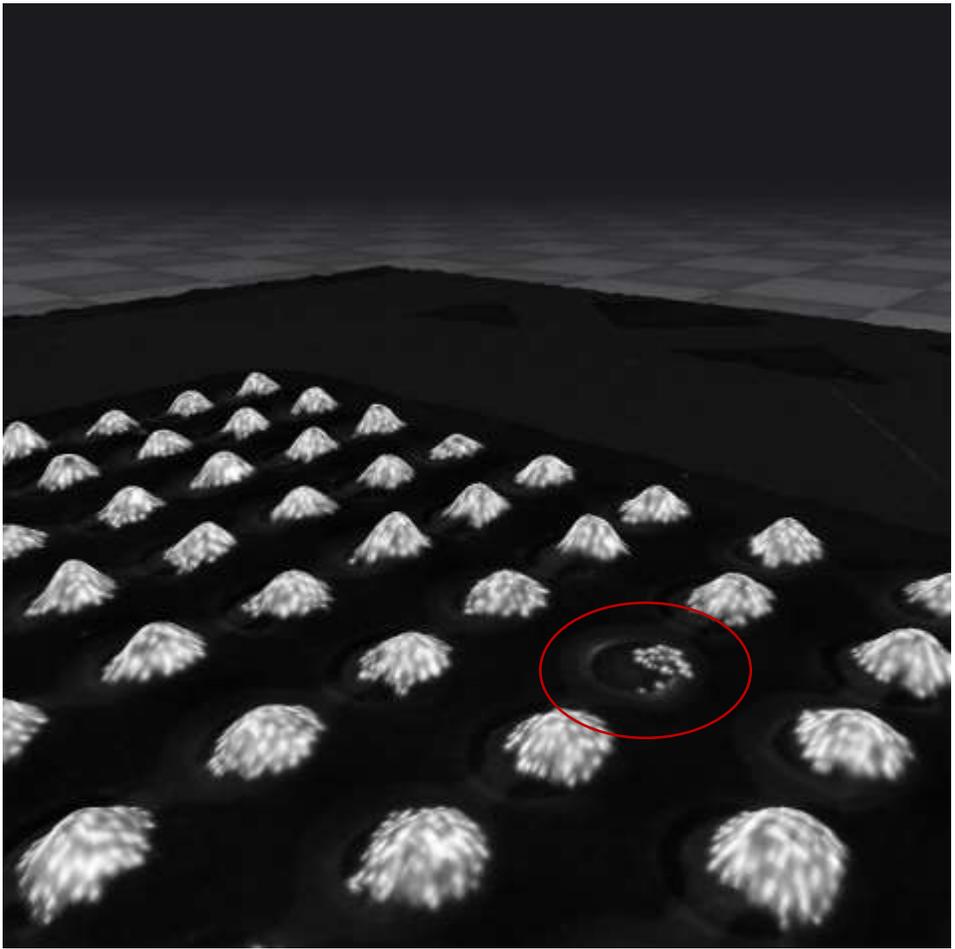
# Example Images

Solder Paste, 100 $\mu$ m height – Cross Section Measurement

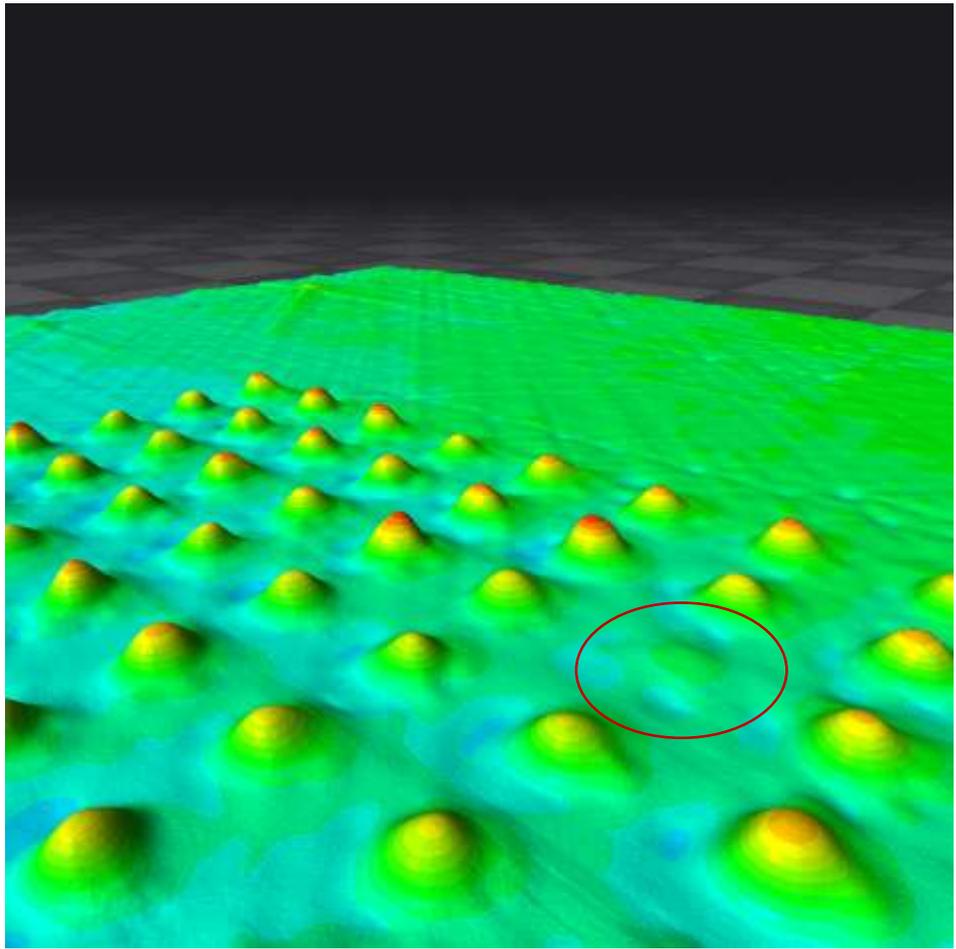


# Example Images

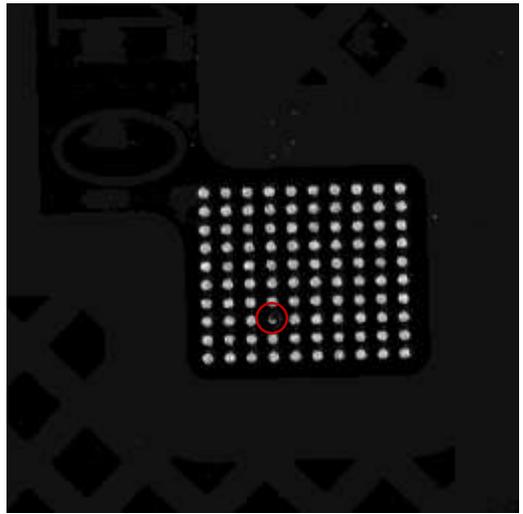
*Solder Paste, 85µm height, missing pad*



3D model with texture



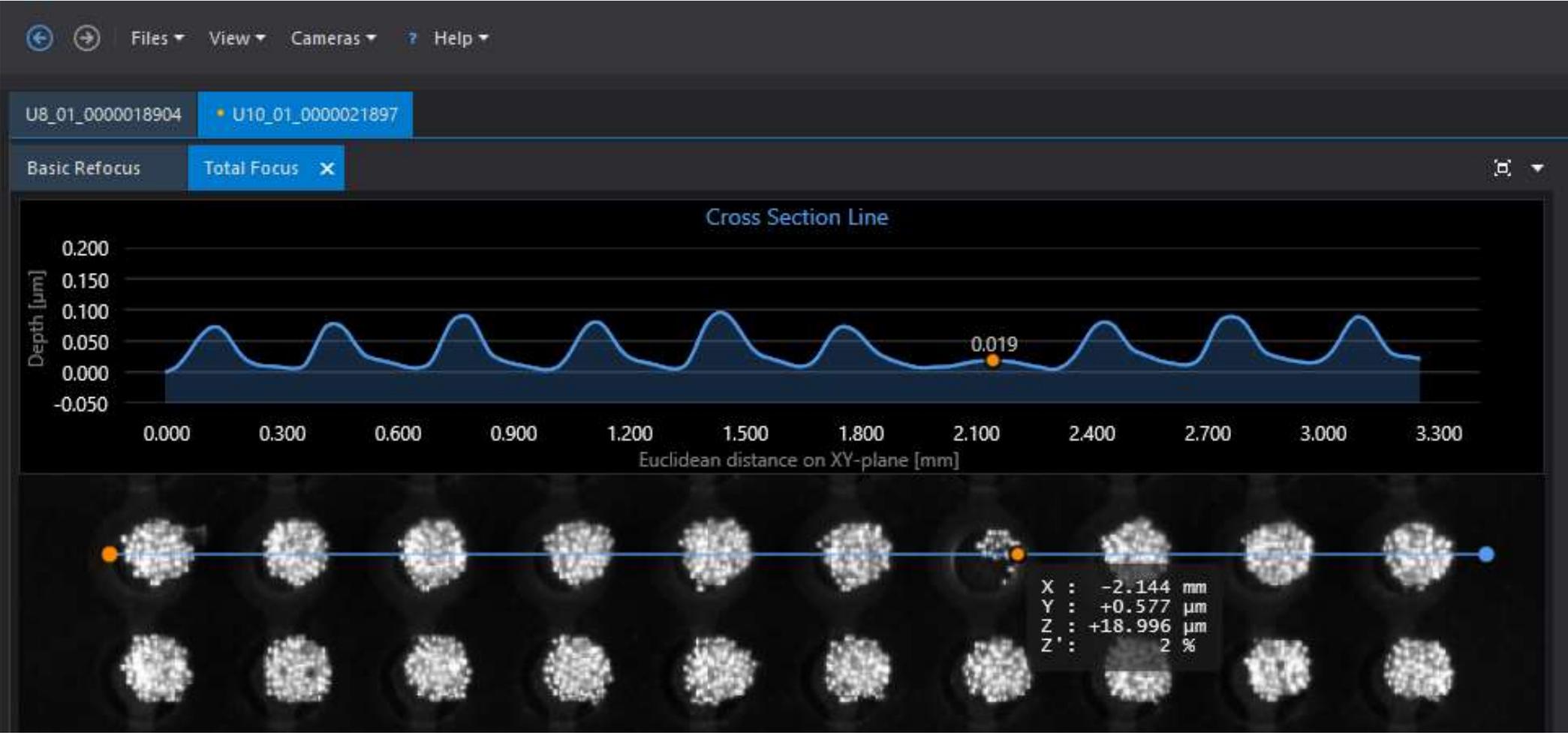
3D model with false color depth map



2D image

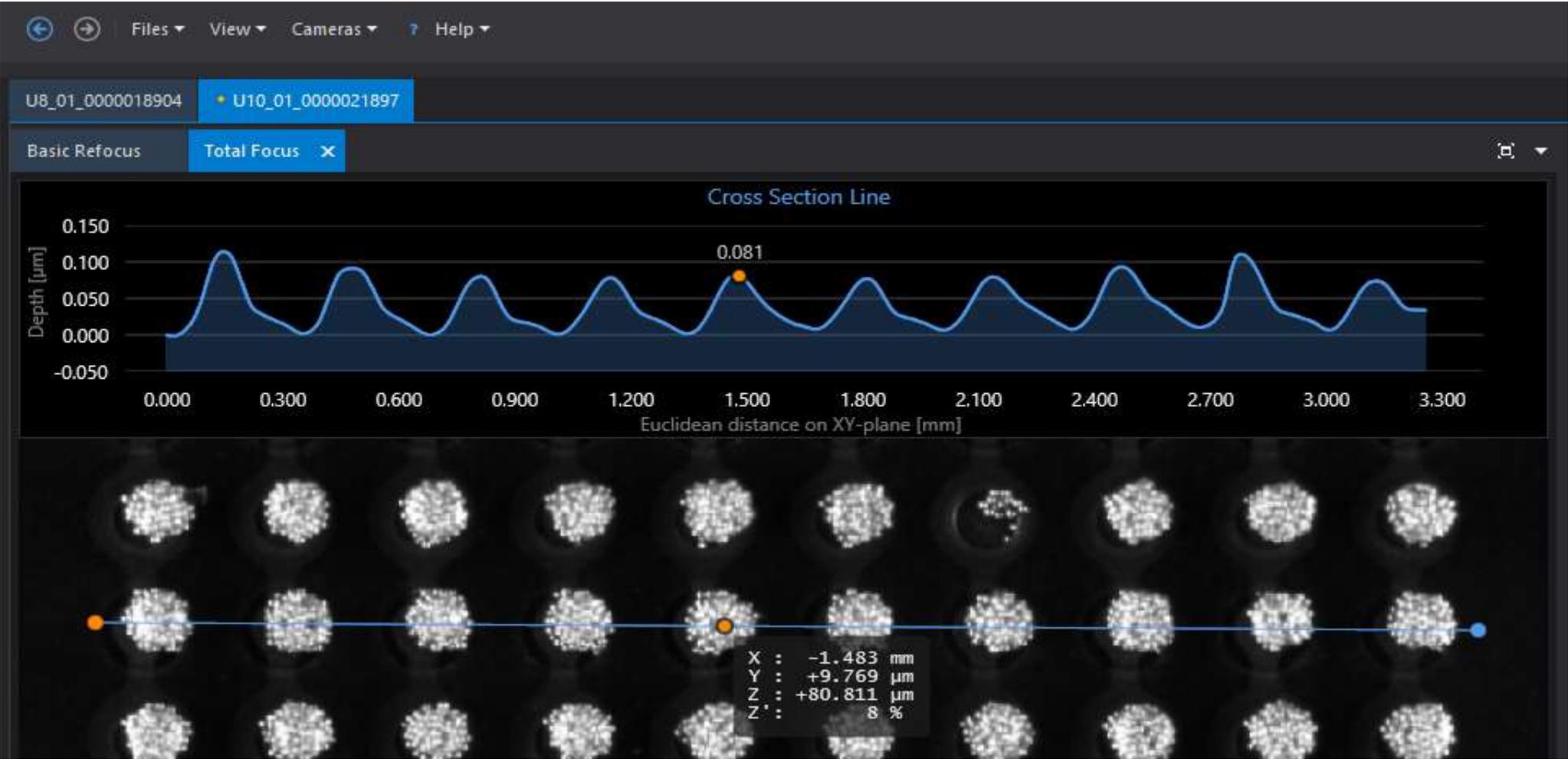
# Example Images

*Solder Paste, 85µm height, missing pad – Cross Section Measurement*



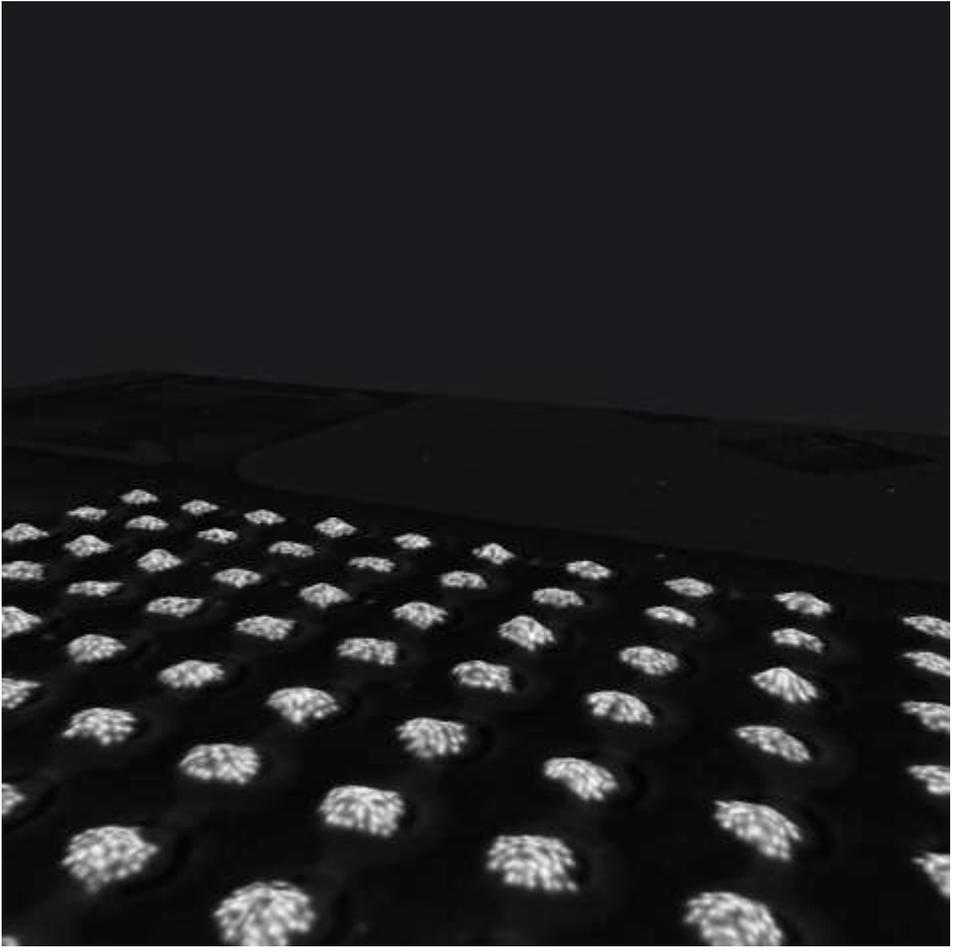
# Example Images

## Solder Paste, 85µm height – Cross Section Measurement

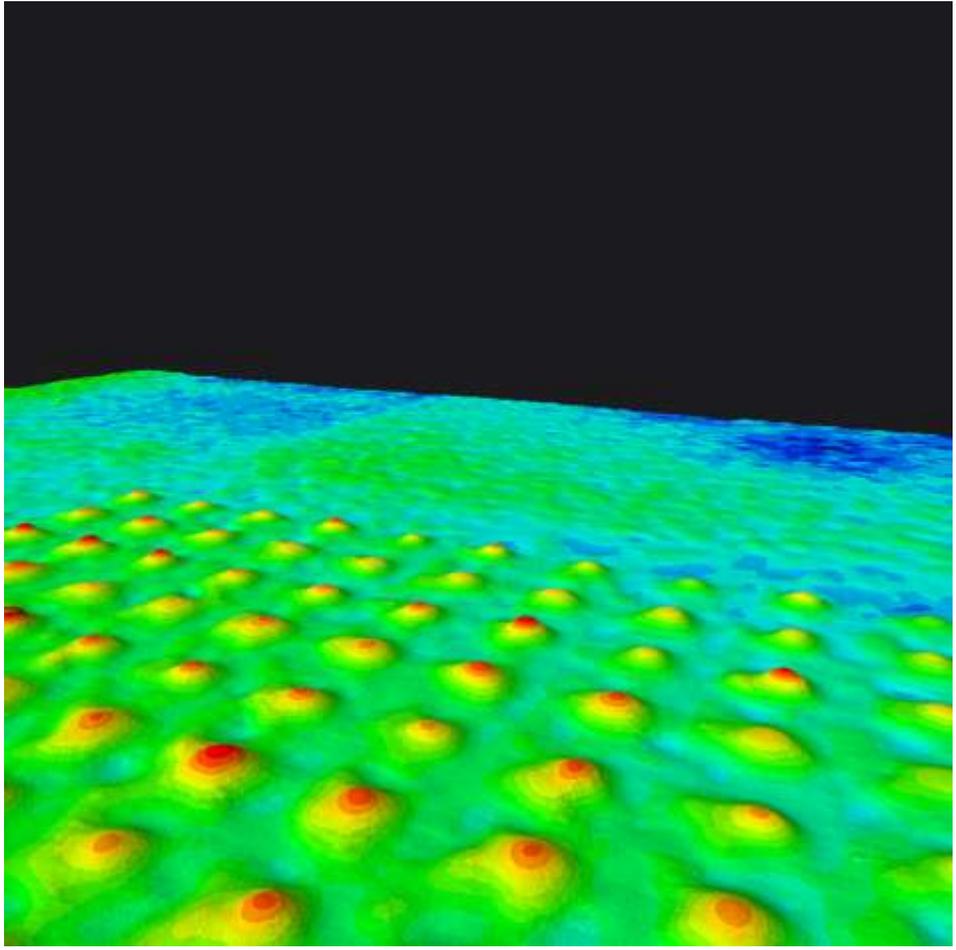


# Example Images

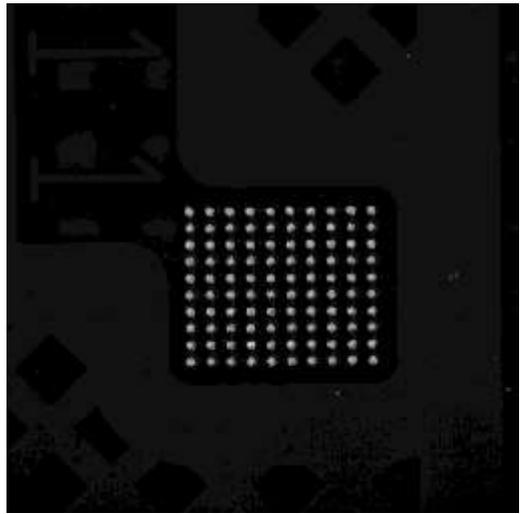
*Solder Paste, 30μm height*



3D model with 2D image as texture



3D model with false color depth map as texture



2D image



# Example Images

## Solder Paste, 100 $\mu$ m height – Cross Section Measurement





# Light Field in micro inspection

*Why light field?*

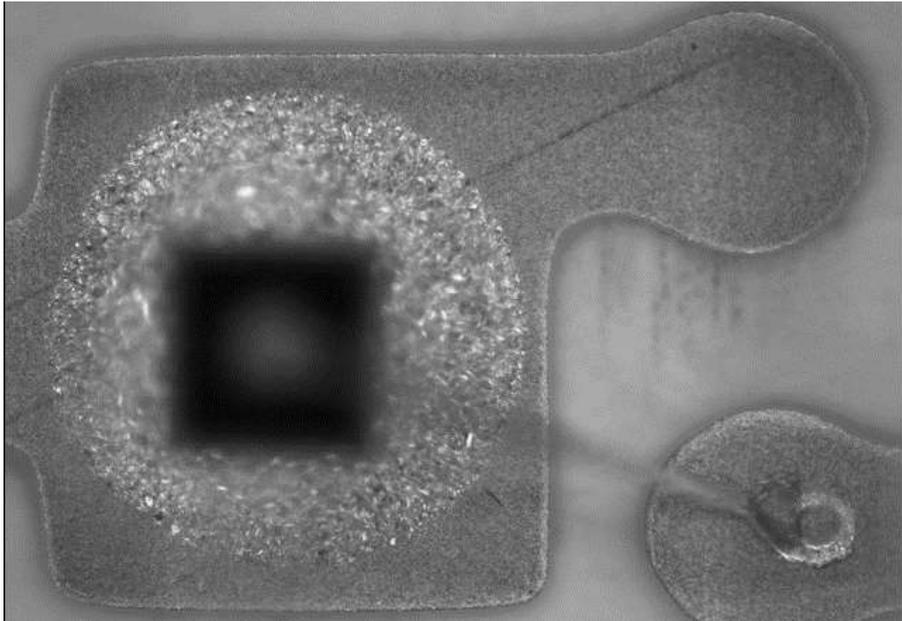
- *extended Depth of Field*
- *occlusion free*
- *fast*

# Extended Depth of Field



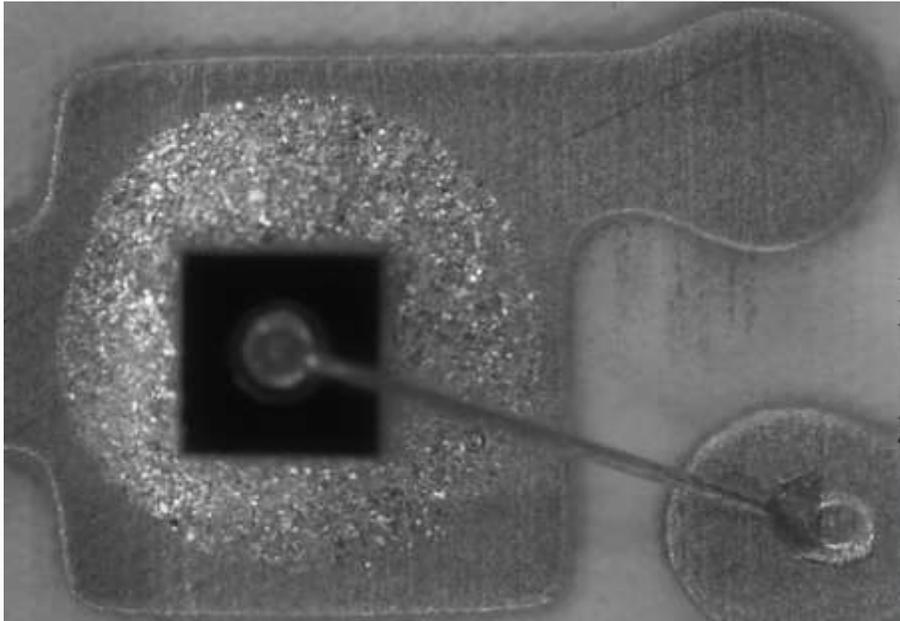
Bonding wire @ 10x

10MP 2D camera

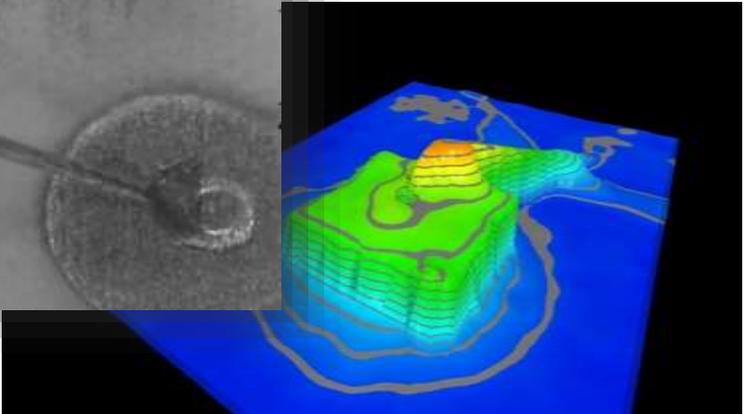


2D image

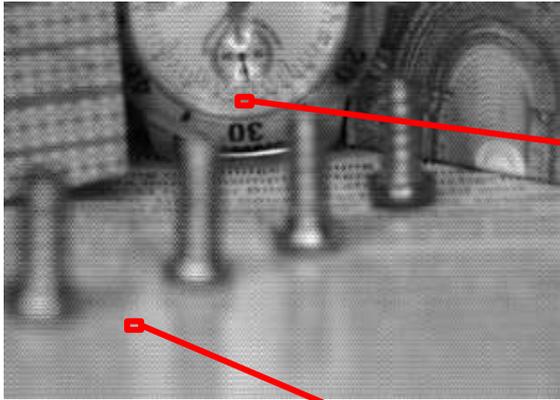
Raytrix light field camera R10μ



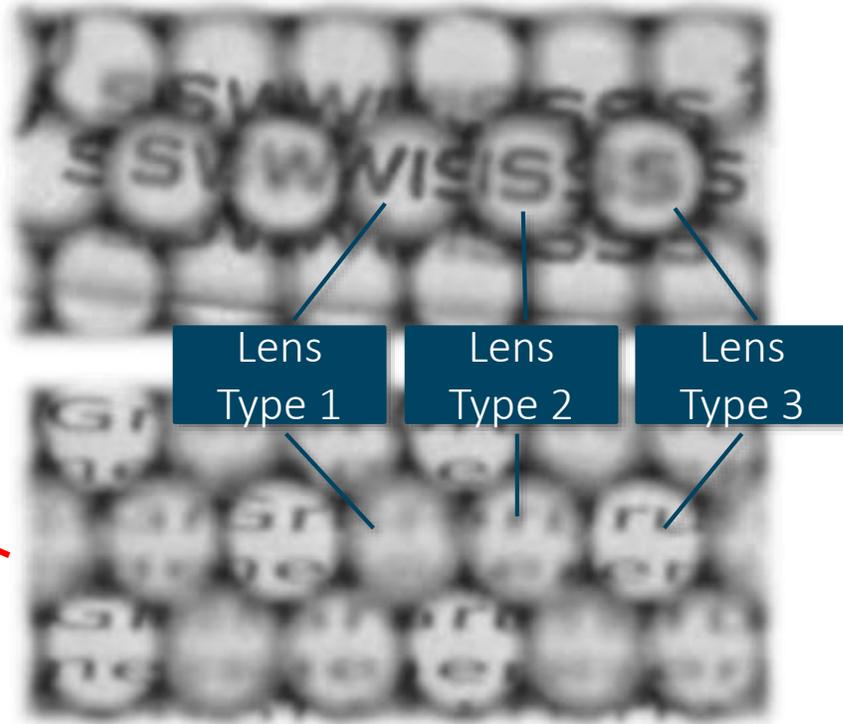
2D image



3D model with false color depth map as texture



light field raw image

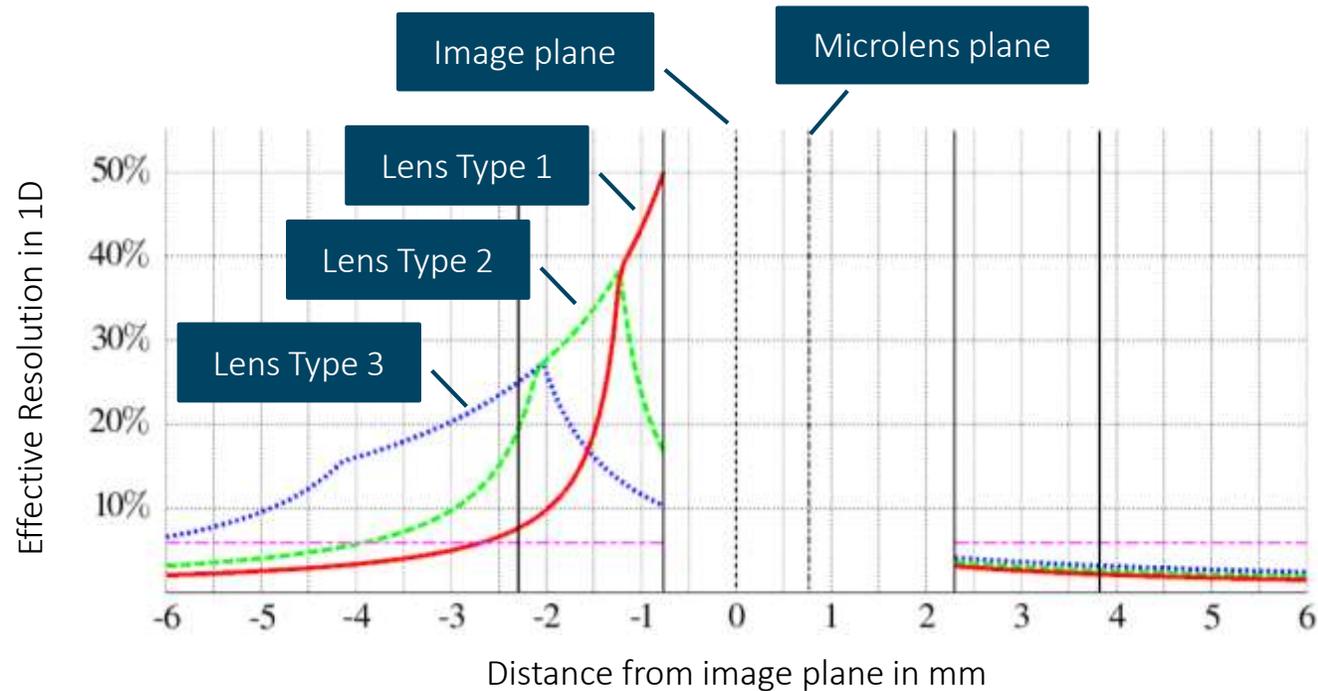


## Extended Depth of Field

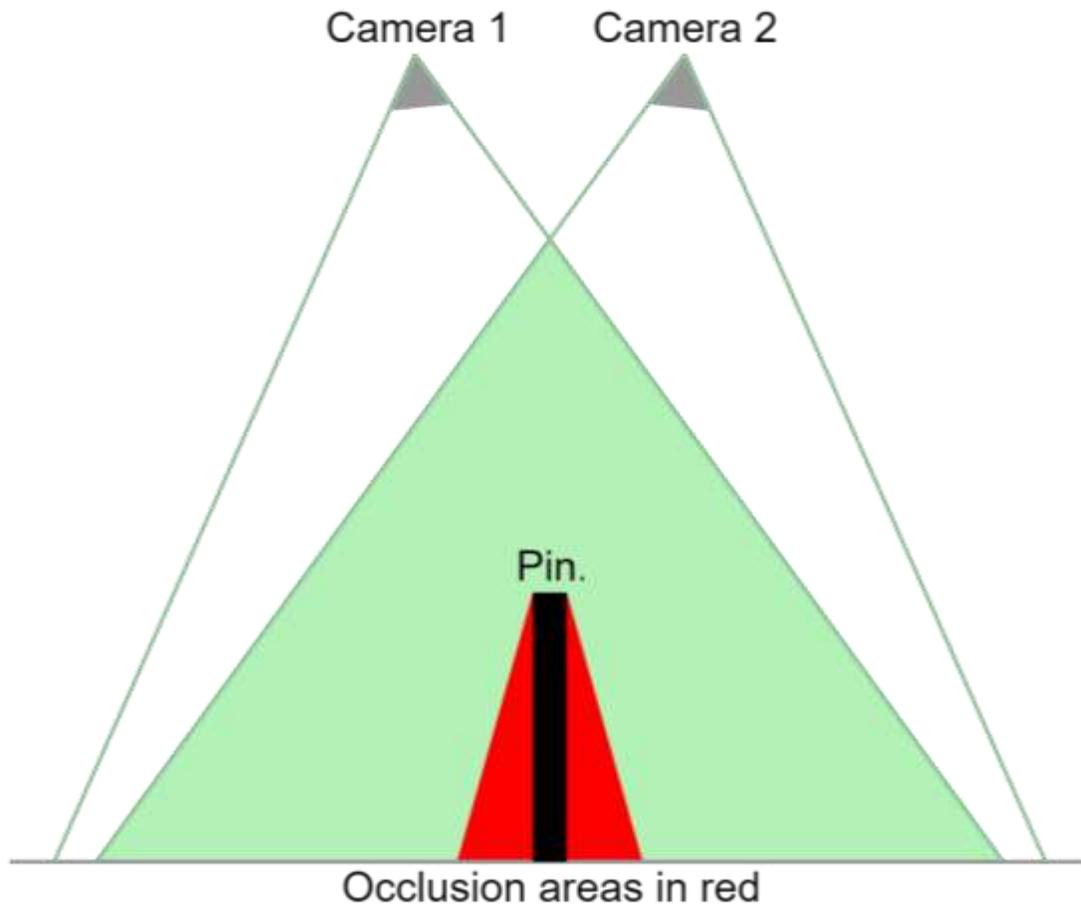
Three lens types are focused on different depths

# Extended Depth of Field

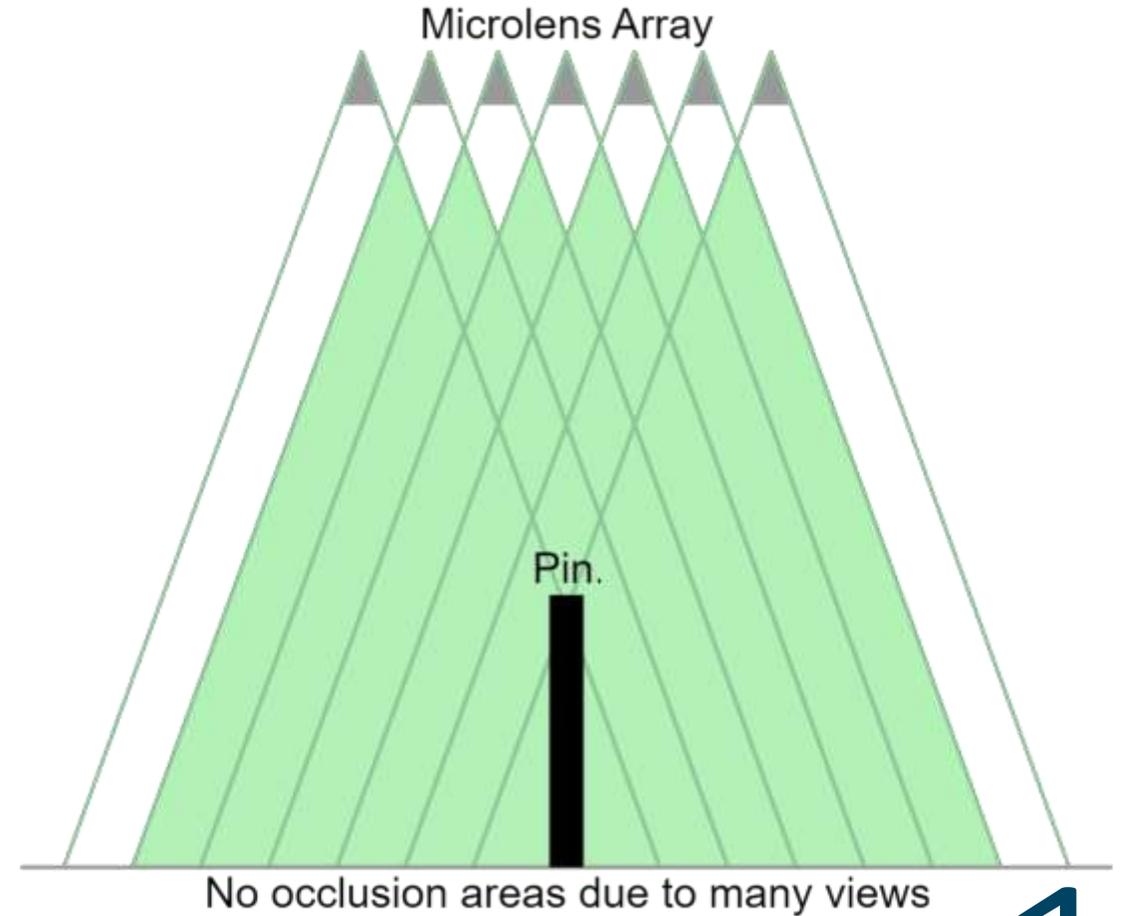
Micro lens DoFs are designed to connect thereby extending the overall Depth of Field up to six times.



Stereo Camera System reconstructs pin as cone



Light Field Camera reconstructs pin as rectangle



CAMERA	MAX. EFF. RES.	MAX. FPS	2D / 3D	MONO	RGB	NIR	CMOS	CCD	PIV	MICRO	INTERFACE
R42	10 MP	7	3D		RGB		CMOS				USB3
R8	2 MP	30	3D	Mono	RGB		CMOS				USB3
R10	2.5 MP	7	3D	Mono			CMOS				USB3
R12	3 MP	60	3D	Mono	RGB	NIR	CMOS				Camera-Link
R29	7,25 MP	5.9	3D	Mono	RGB	NIR		CCD	PIV		GigE, Camera-Link
R5	1 MP	180	3D	Mono	RGB	NIR	CMOS		PIV	μ	GigE, Camera-Link
R10 Micro	2.5 MP	7	3D	Mono			CMOS			μ	USB3
R12 Micro	3 MP	5.5	3D	Mono	RGB			CCD	PIV	μ	GigE
C42	41,3 MP	7@8k, 30@4k	2D		RGB		CMOS				USB3
C42i	41,3 MP	7@8k, 30@4k	2D		RGB		CMOS				USB3
R26 Video	6,25 MP	80	3D	Mono	RGB		CMOS				CXP, Camera-Link
R47	11,75 MP	7	3D	Mono	RGB			CCD	PIV		CXP
R71	17,75 MP	3	3D	Mono	RGB		CMOS				USB3
Rx Multi Light Field	25% of original resolution	on request	3D	Mono	RGB	NIR	CMOS				USB, GigE, CL, CXP, Wi-Fi

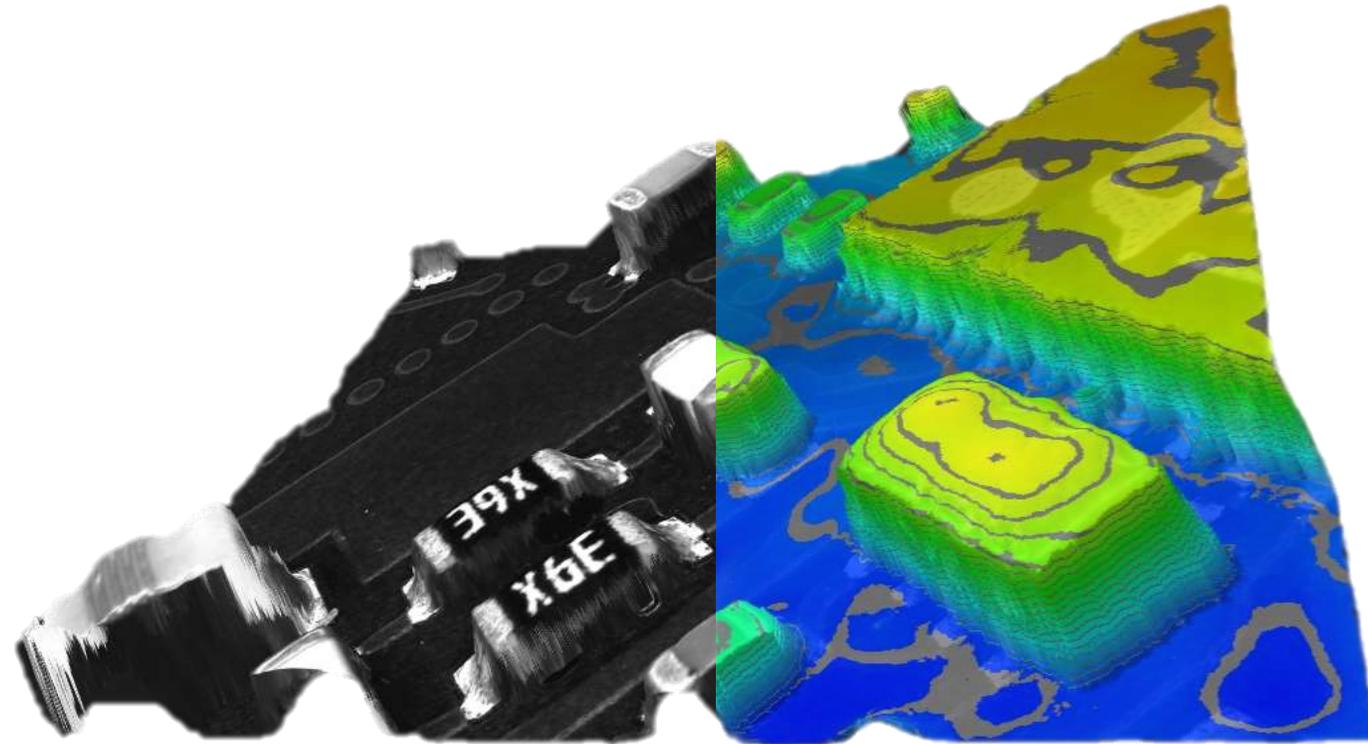
## Fast

- Up to 330 fps captured
- Up to 60 fps processed per GPU
- Multi GPU support



# Light Field in micro inspection

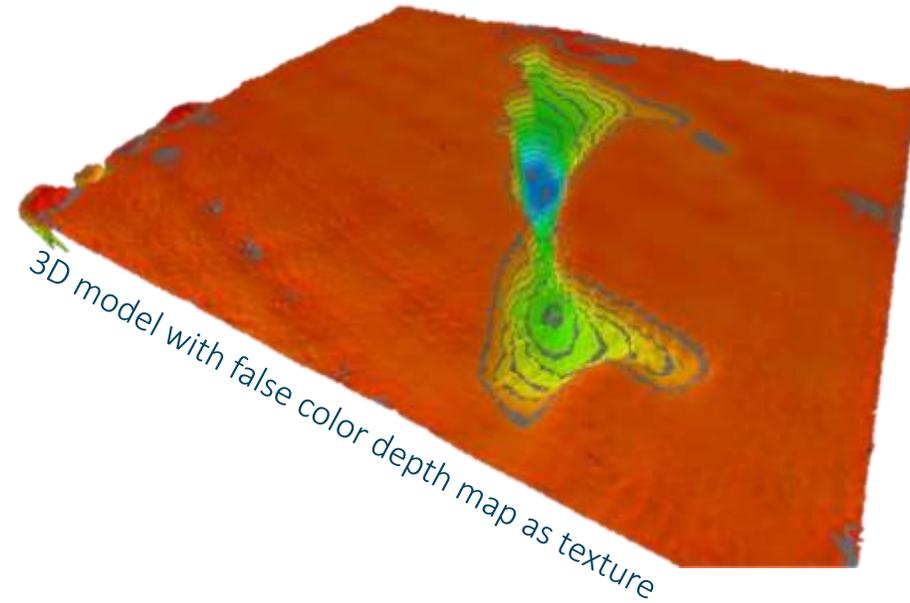
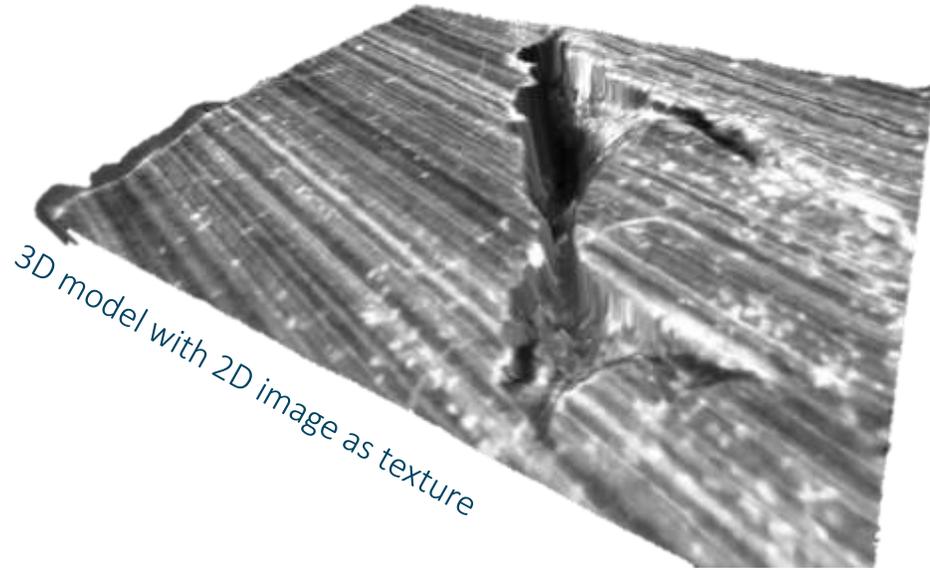
*Other applications*

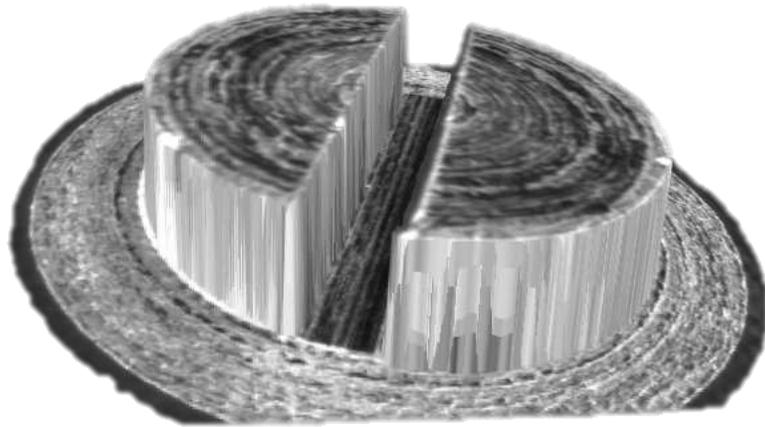


3D model (texture / false color depth)

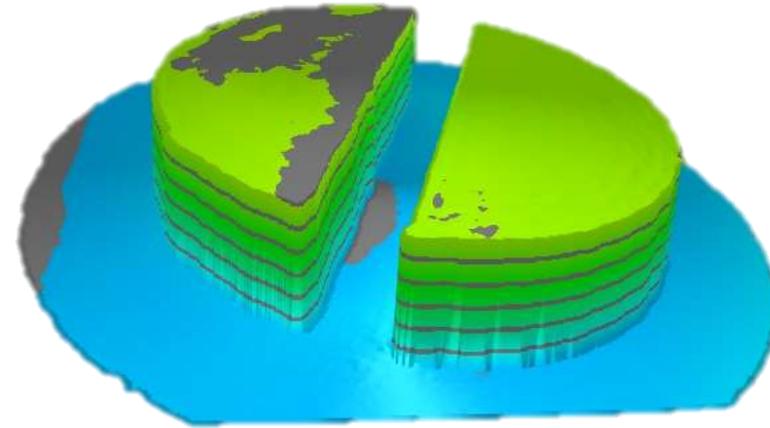
# Scratch / Cavity

*How deep is the cavity?*





3D model with 2D image as texture

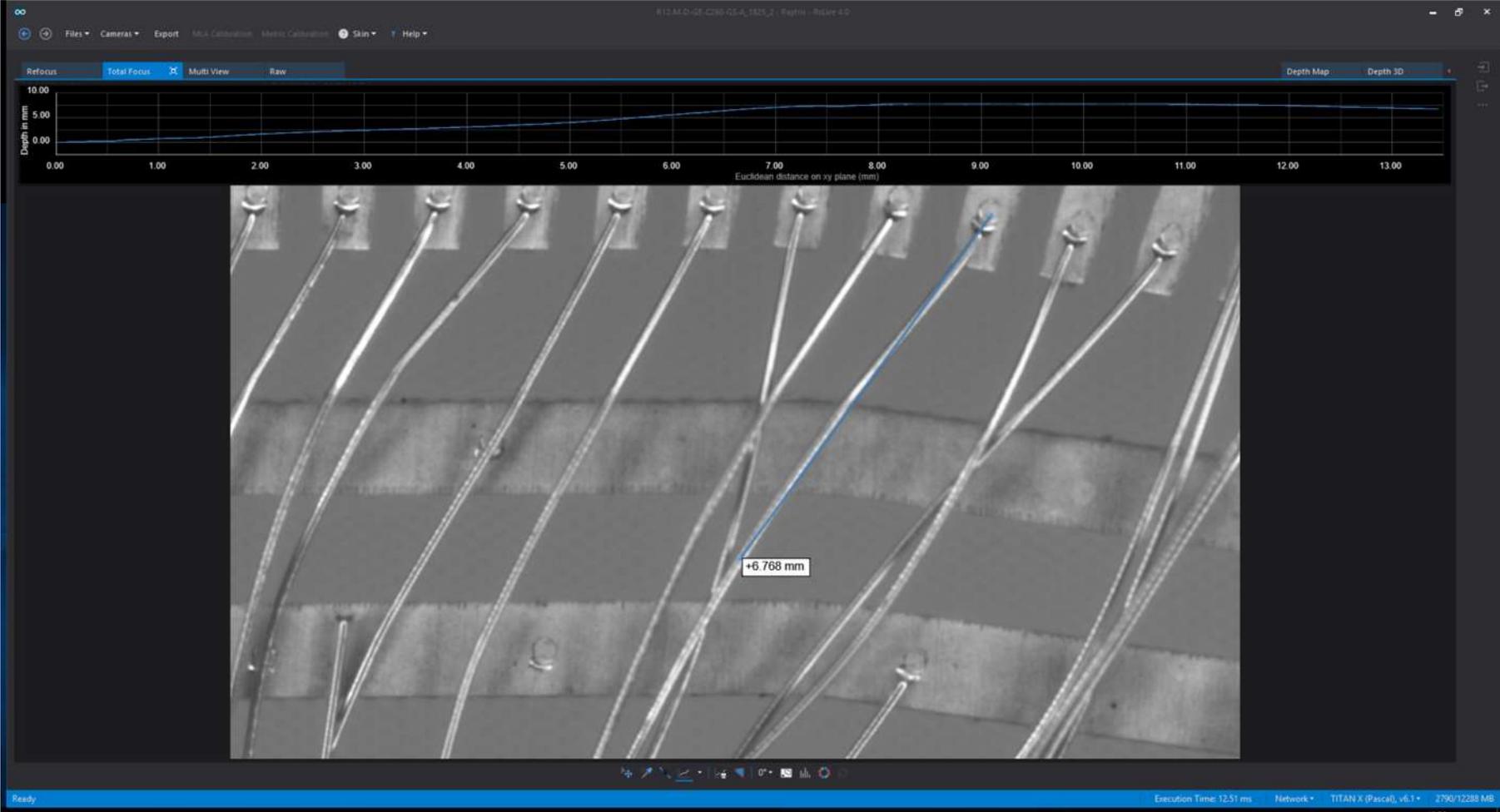


3D model with false color depth map as texture

# Bonding wires

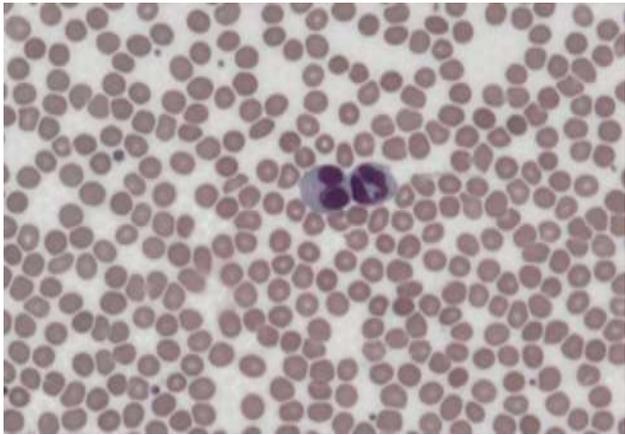
*What is the curvature of the bonding wires?*

RxLive / 3D cross section measurement

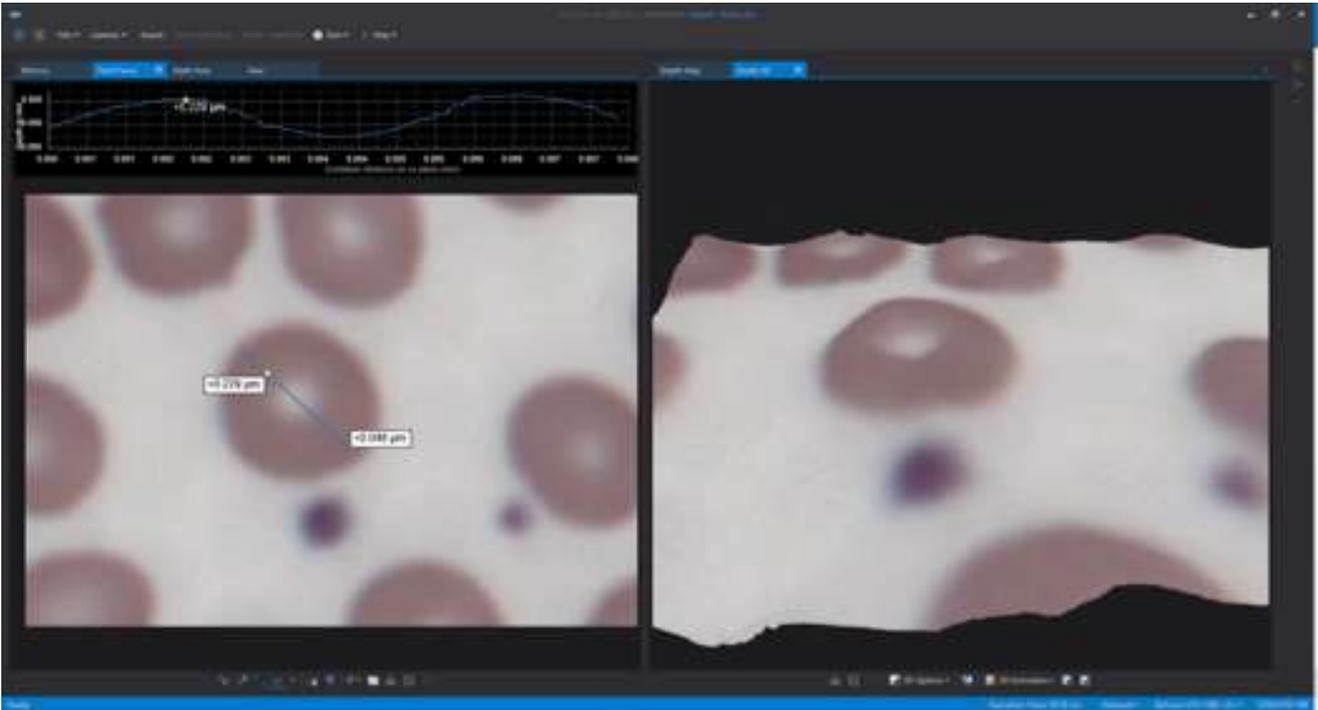
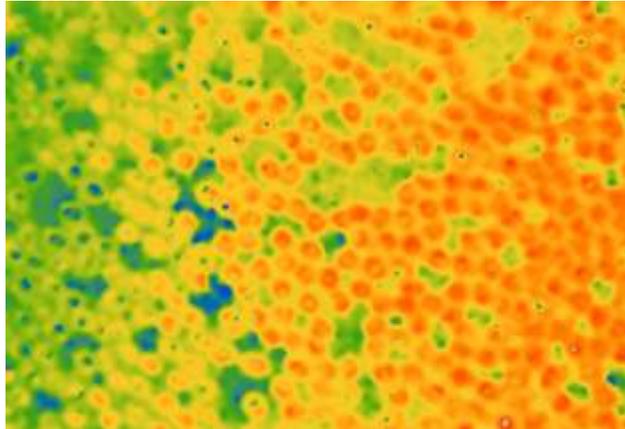


## *Volume of red and white blood cells*

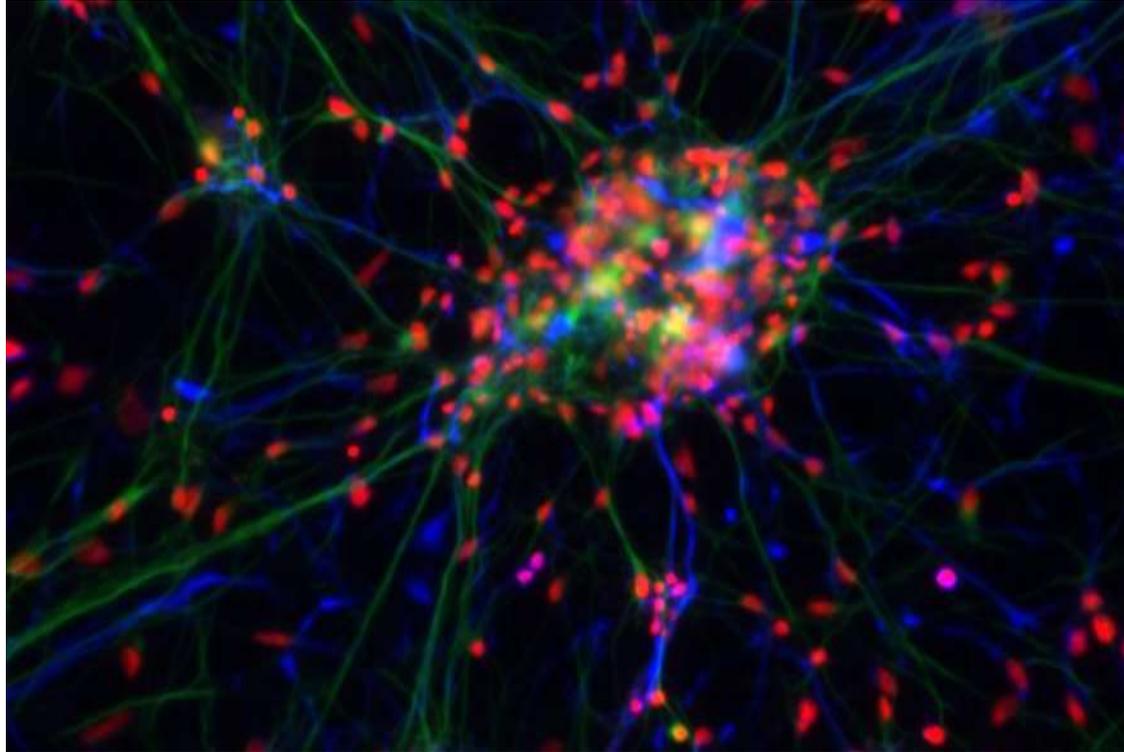
2D texture



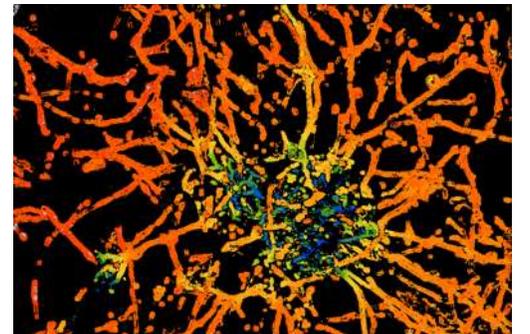
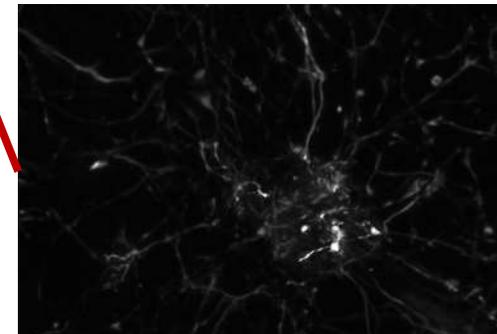
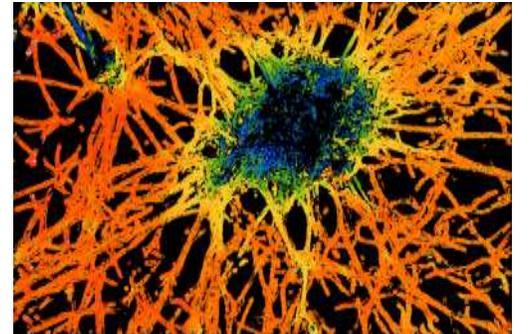
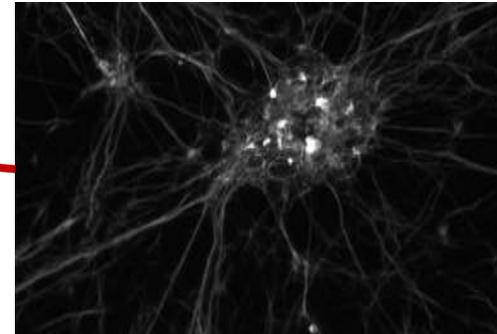
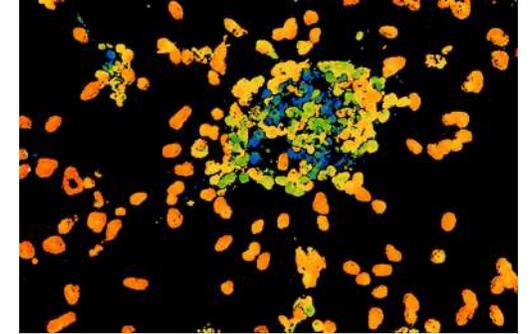
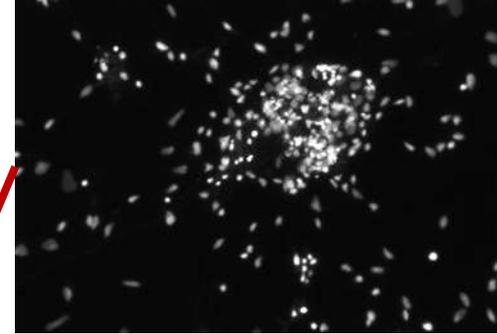
false color depth map



RxLive / 3D cross section measurement

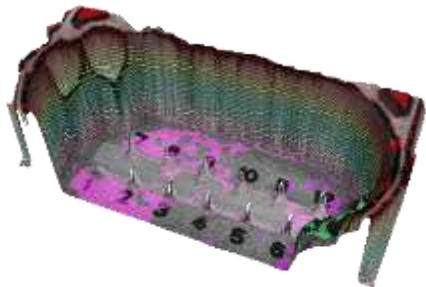
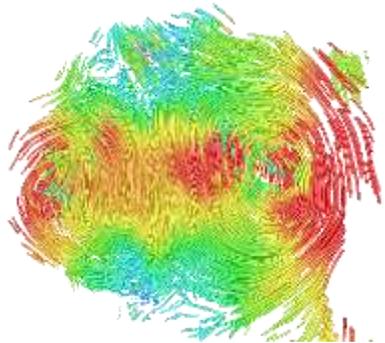


False color stack of three fluorescence excitations



2D texture for each wavelength

False color depth map



[www.raytrix.de](http://www.raytrix.de)

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