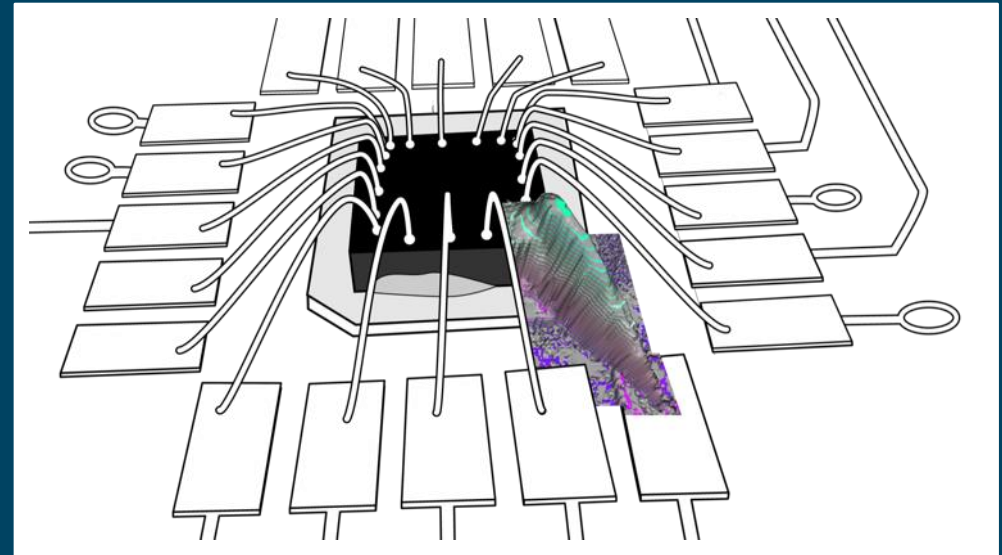




light field for micro inspection

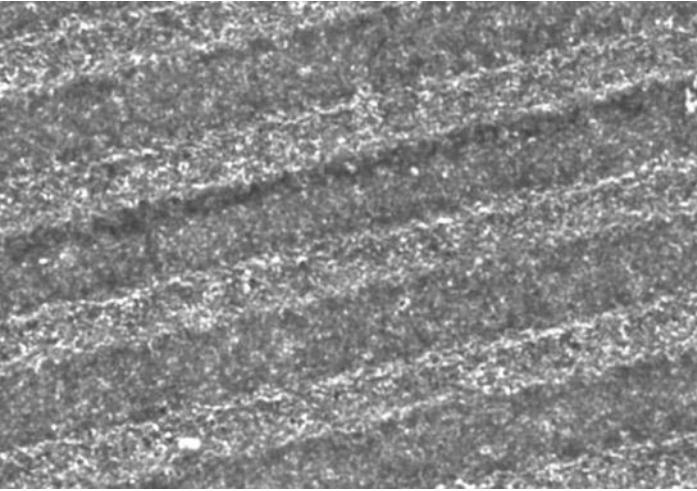
Applications



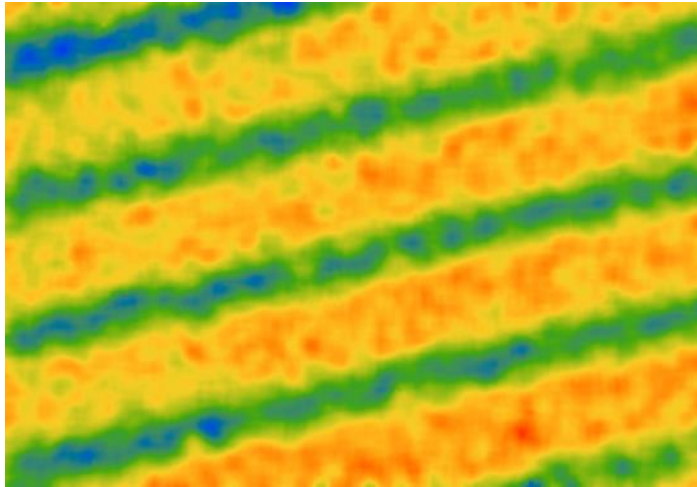
Solar panels

Is the surface roughness within tolerance after cutting?

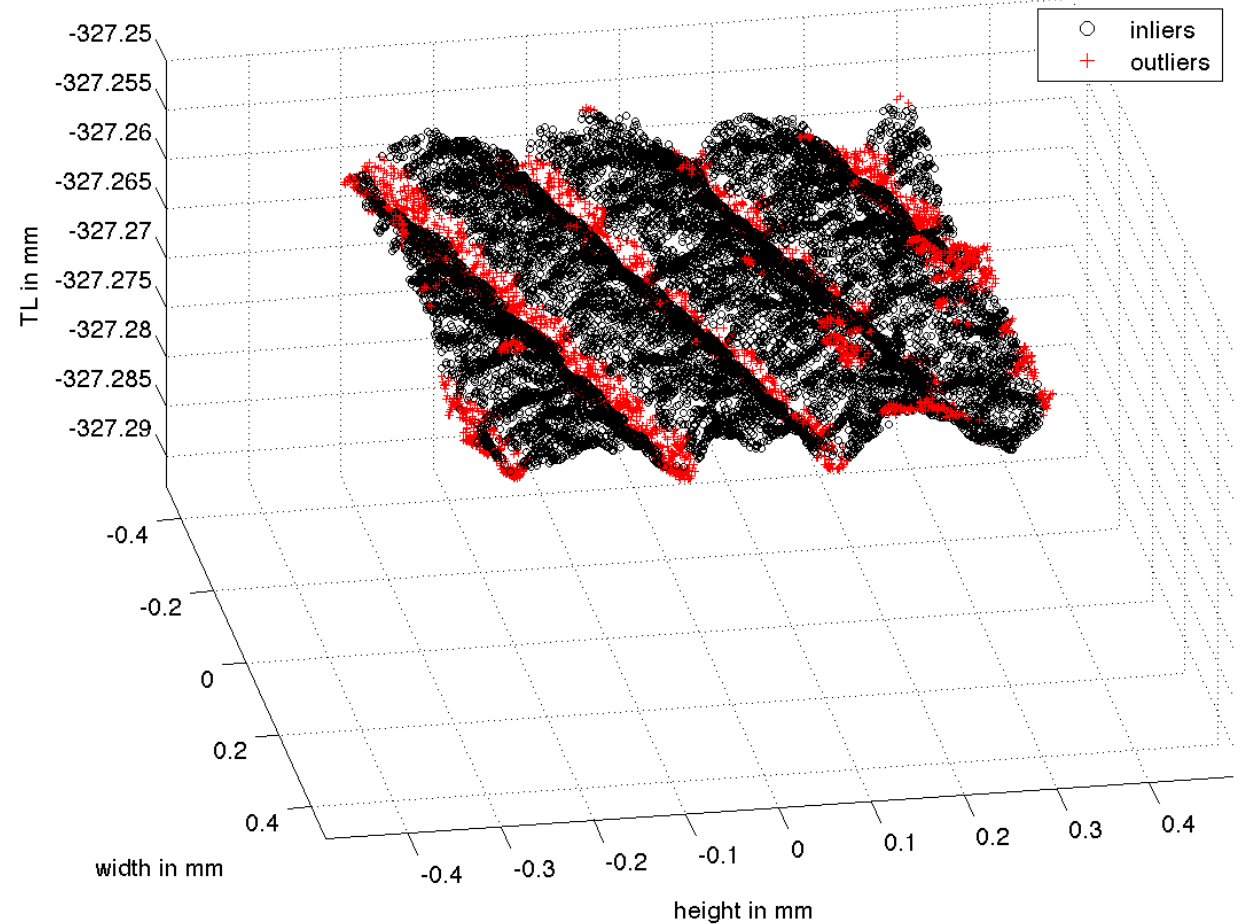
2D texture



false color depth map



analysis of point cloud data

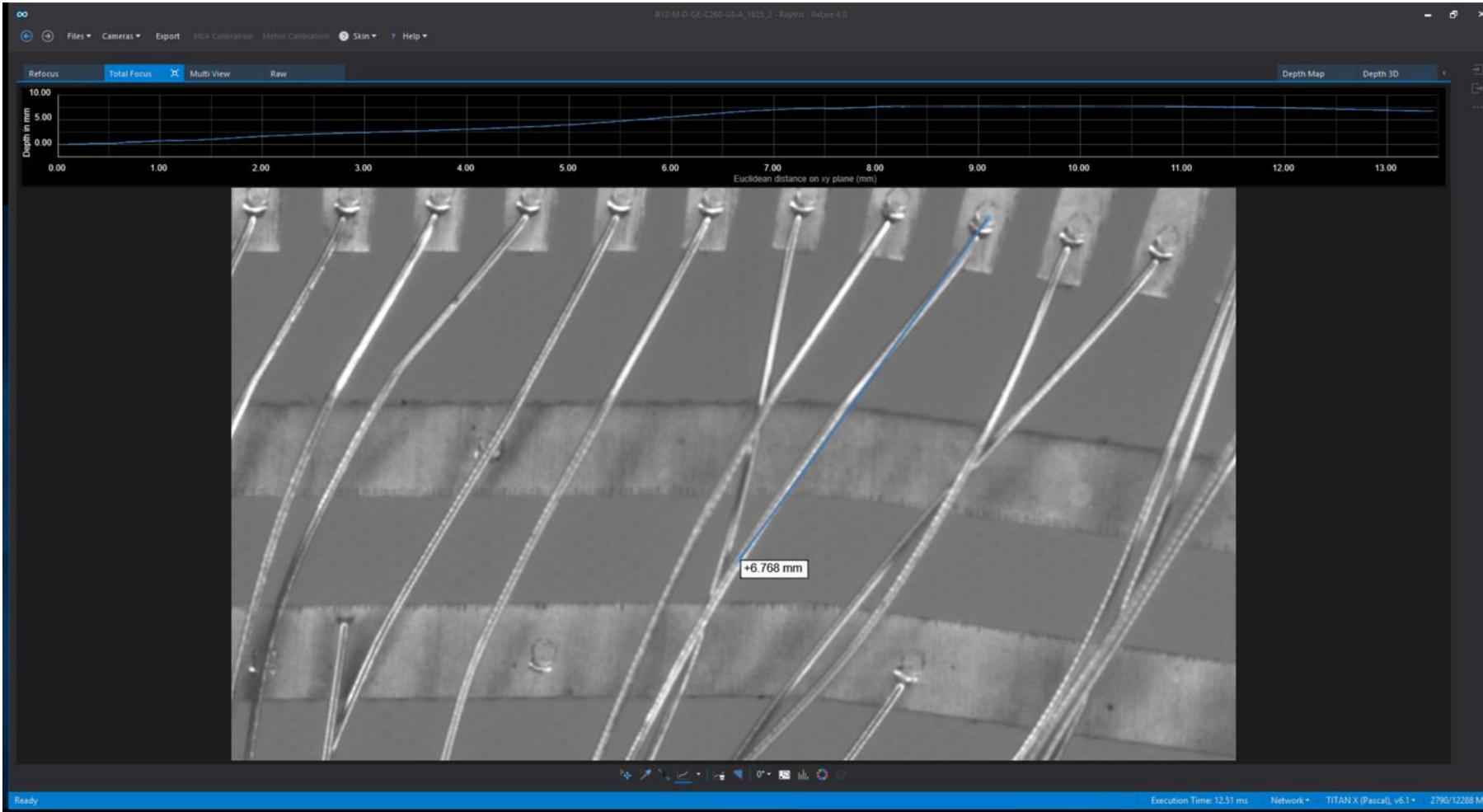


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Bonding wires

What is the curvature of the bonding wires?

RxLive / 3D cross section measurement

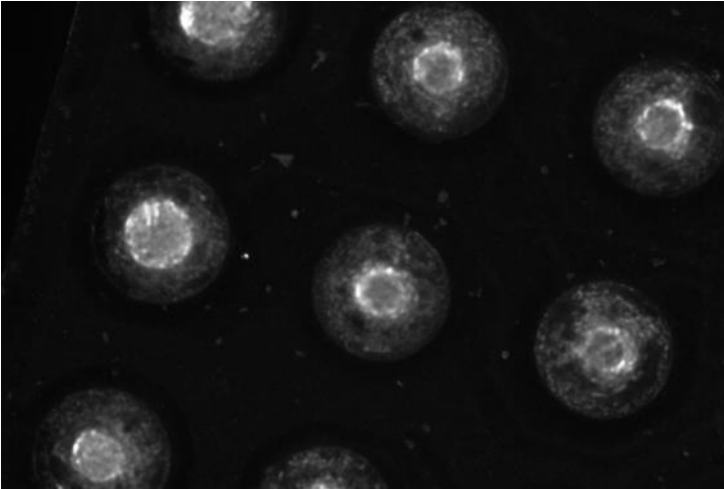


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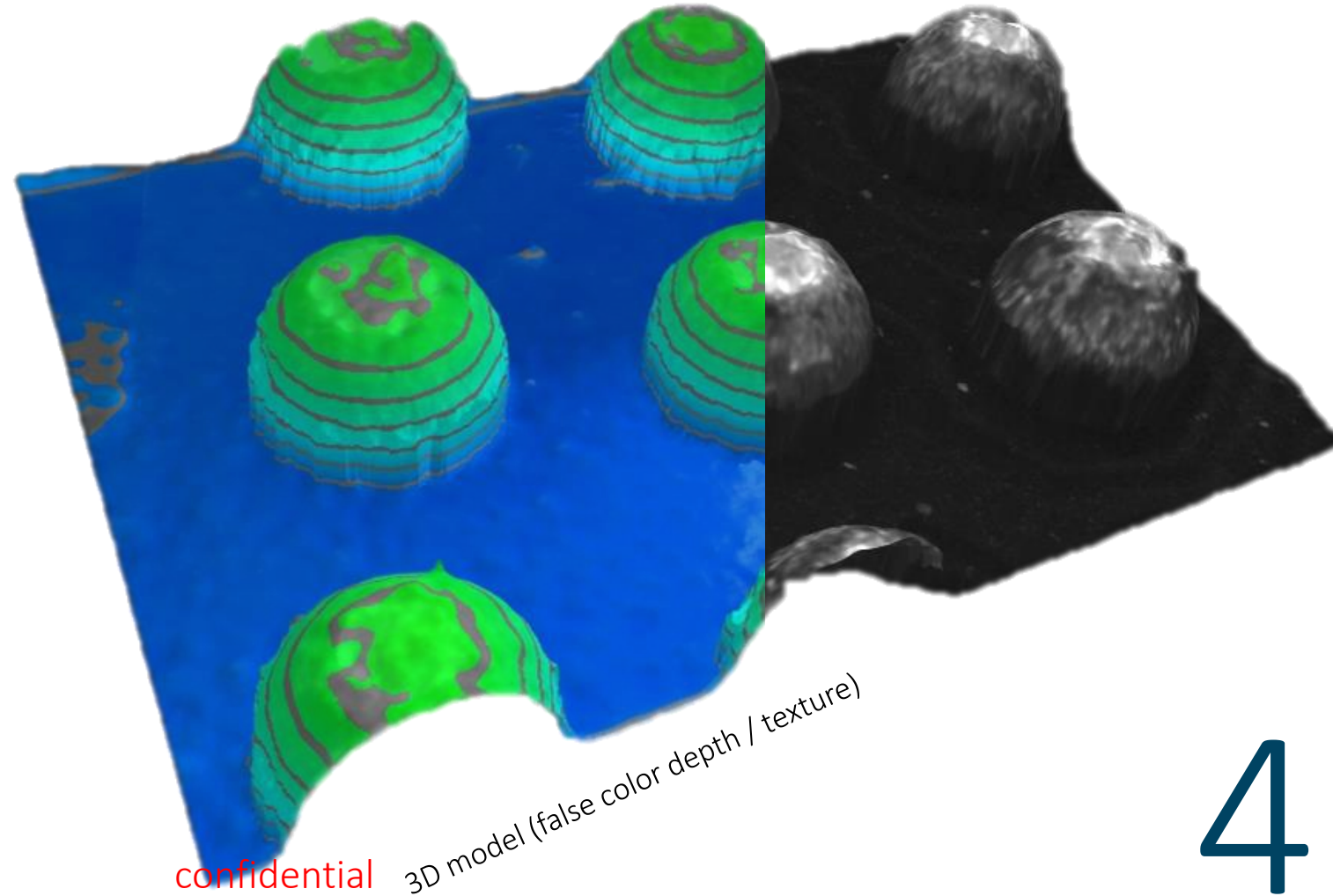
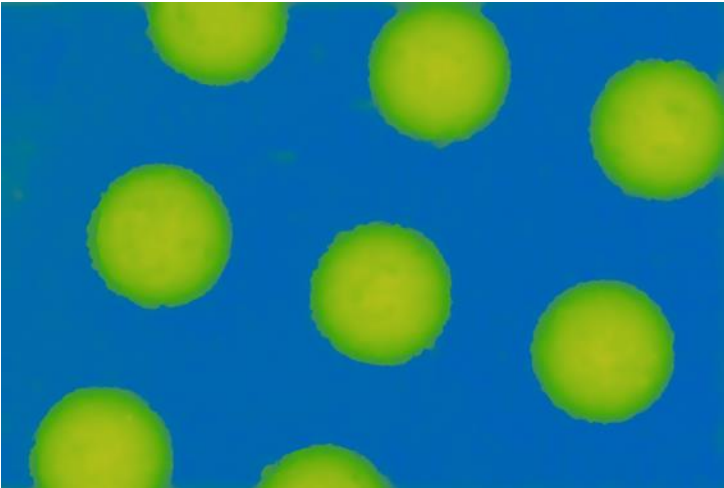
Soldering bumps

What is the volume of the soldering bumps?

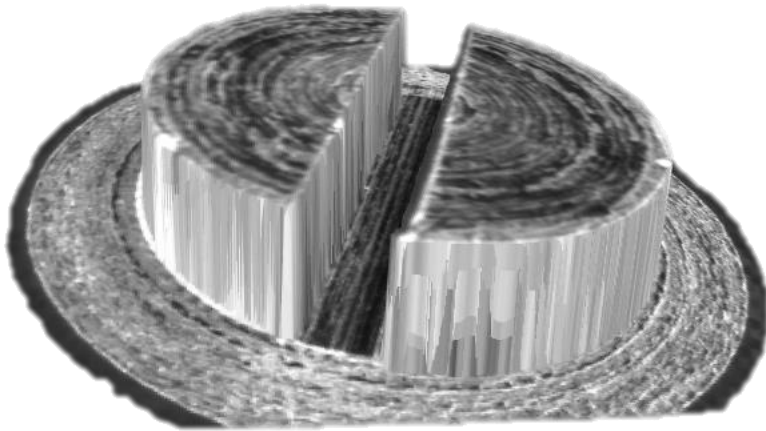
2D texture



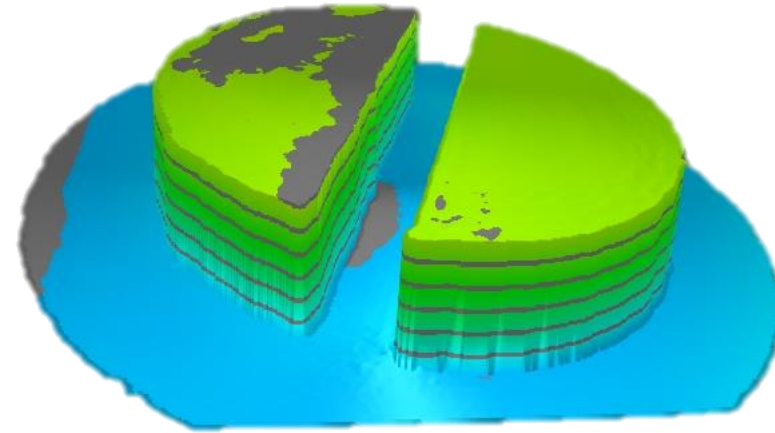
false color depth map



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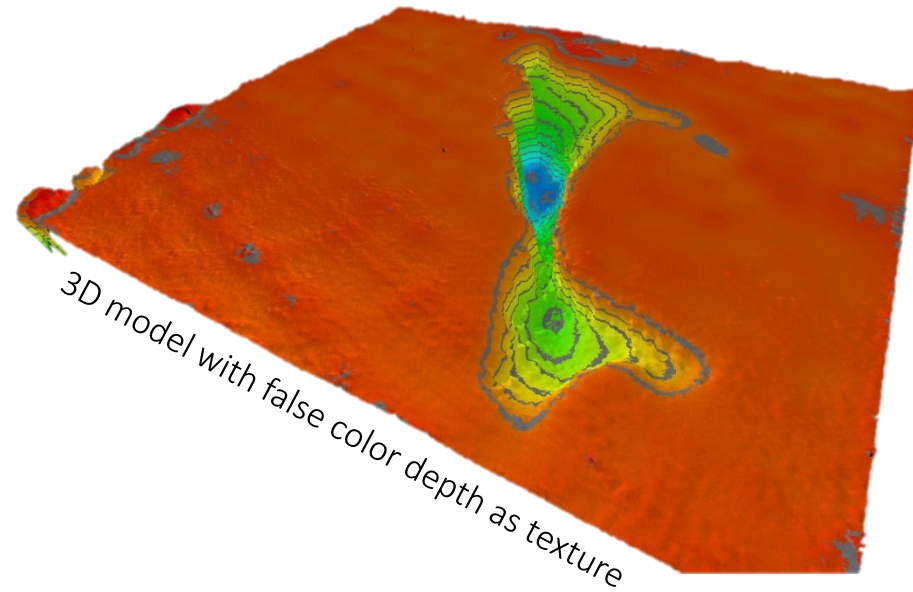
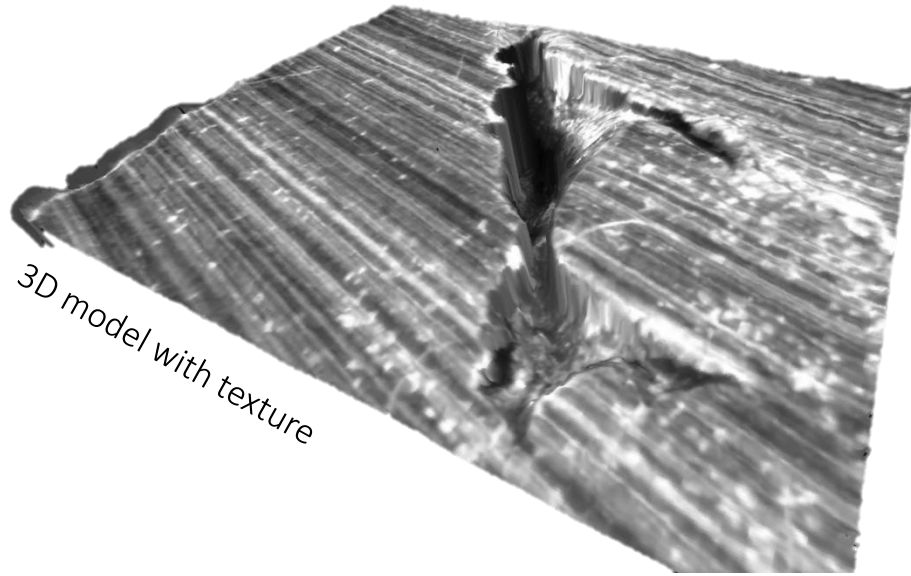
3D model with texture

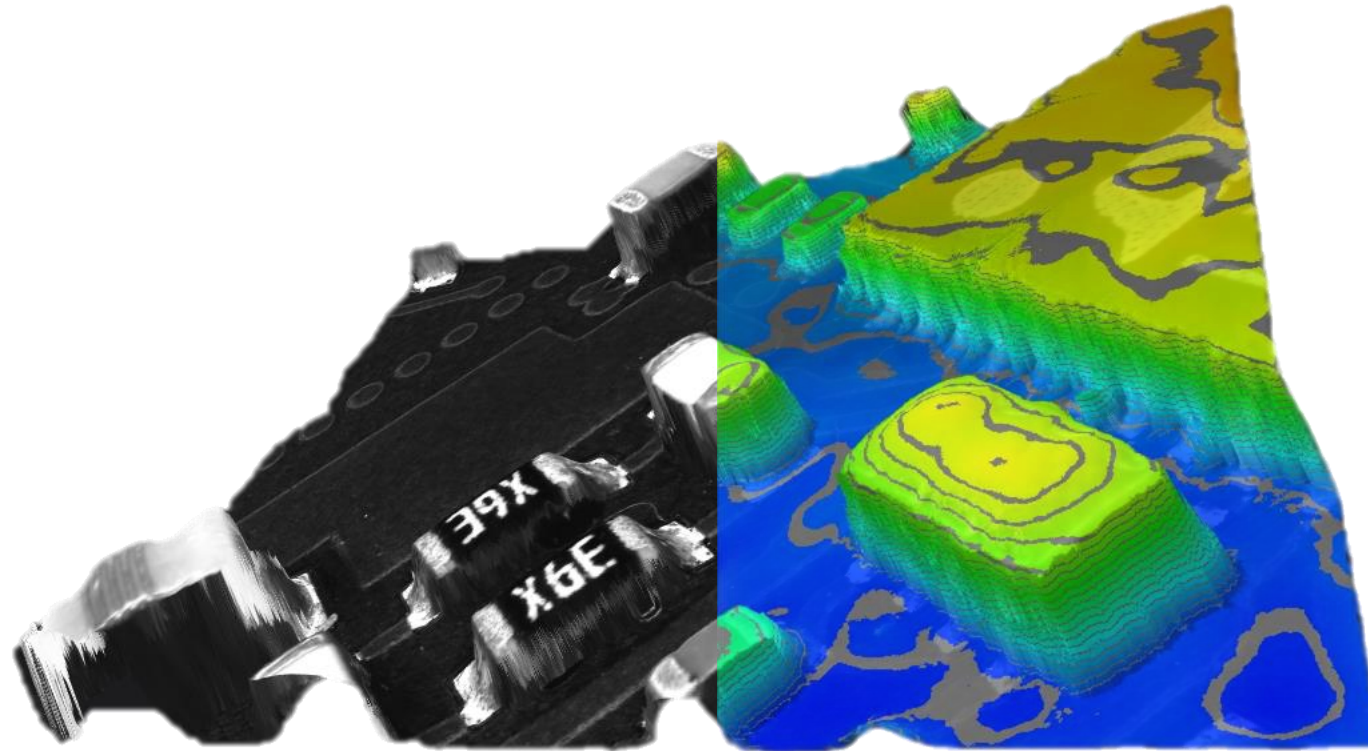


3D model with false color depth as texture

Scratch / Cavity

How deep is the cavity?

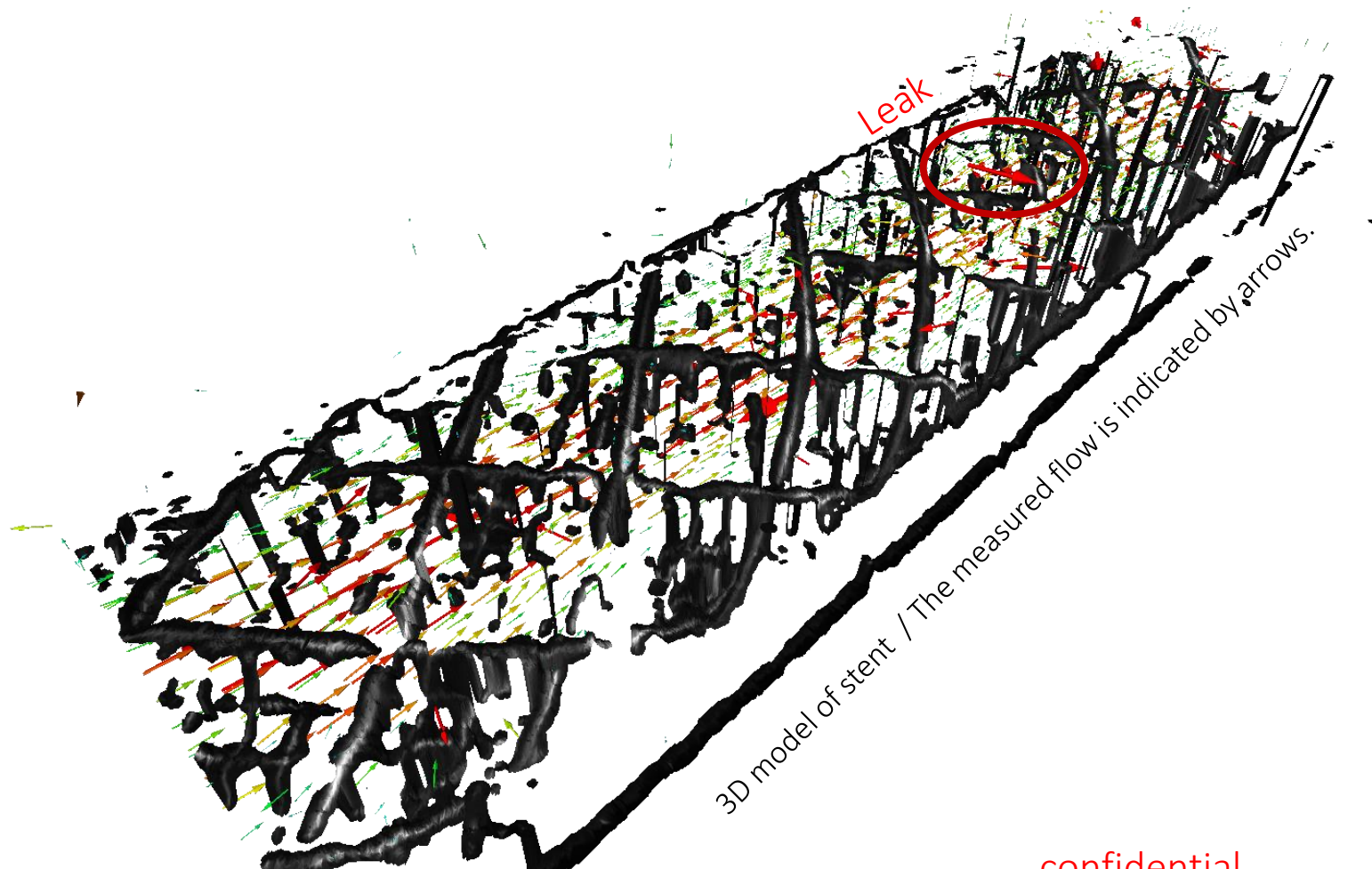




3D model (texture / false color depth)

Stent - micro flow

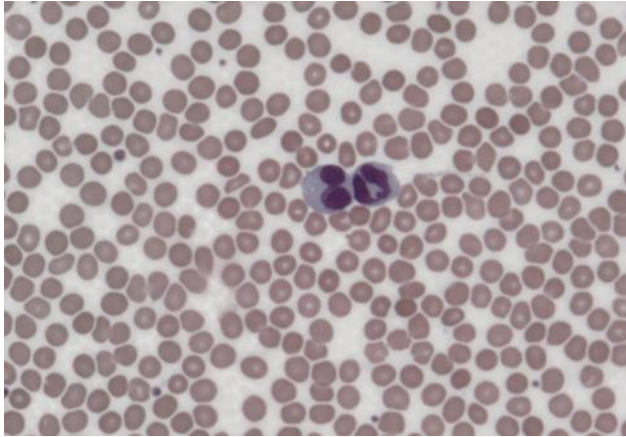
Will blood flow between the stent and the blood vessel?



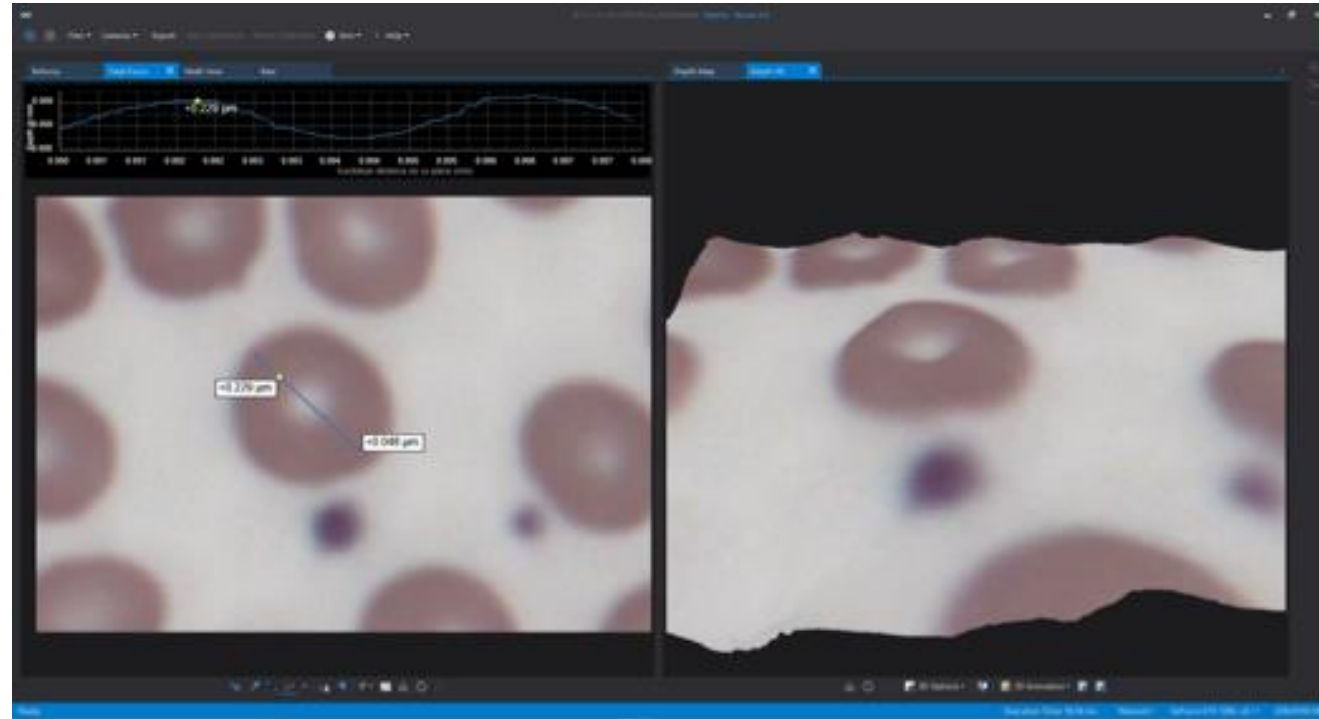
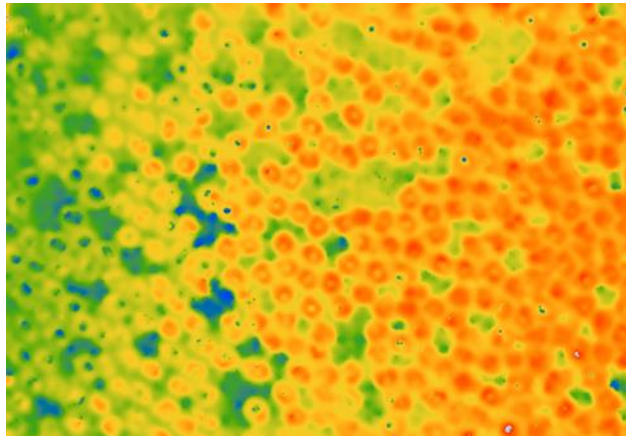
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Volume of red and white blood cells

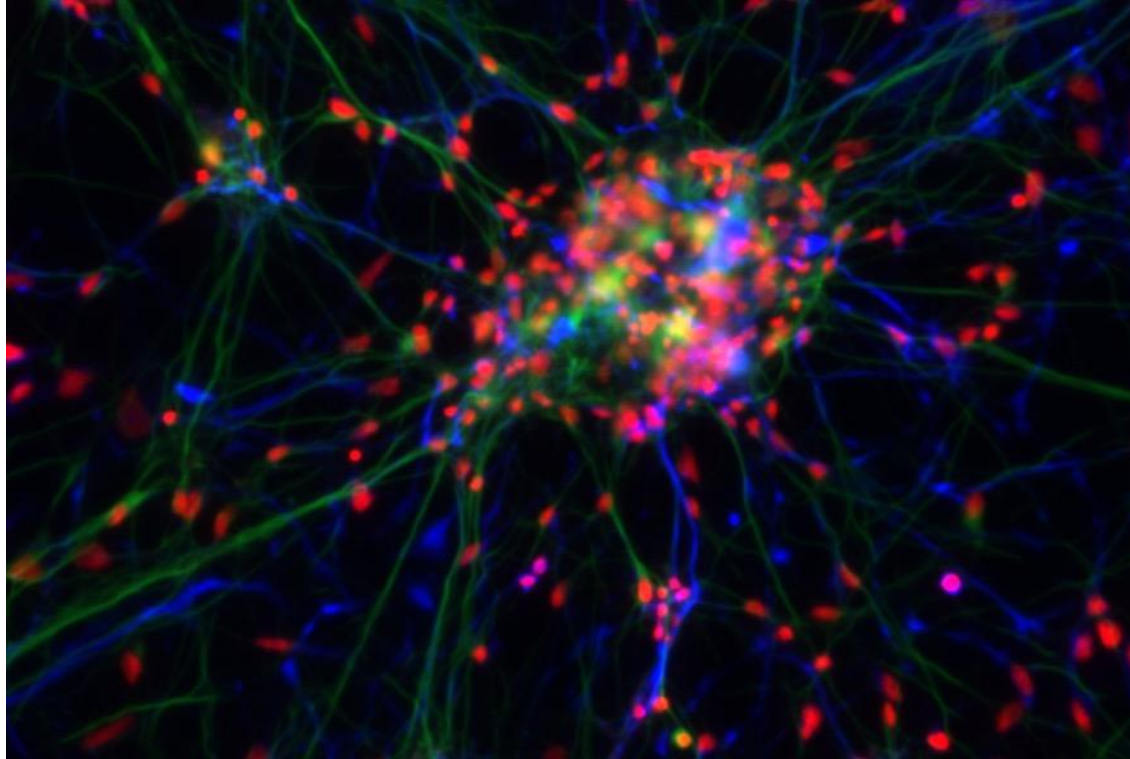
2D texture



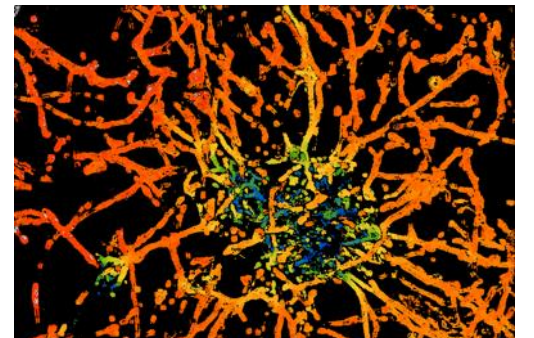
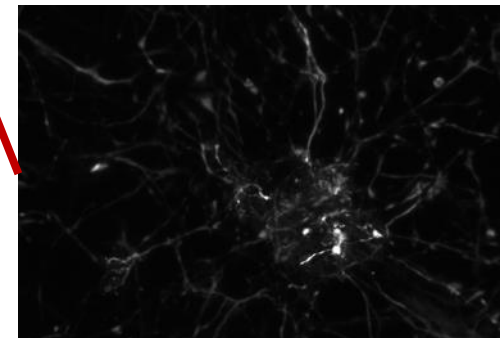
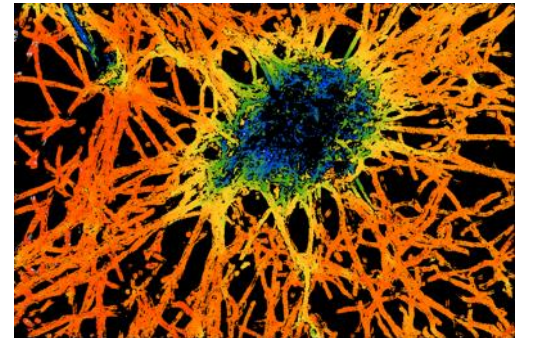
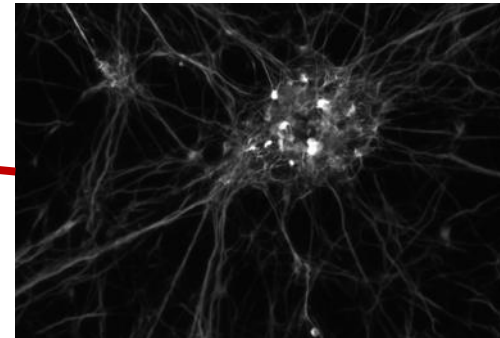
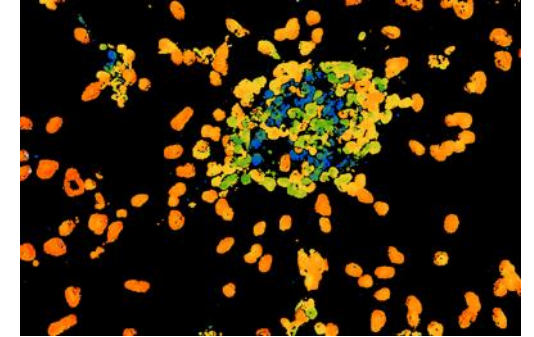
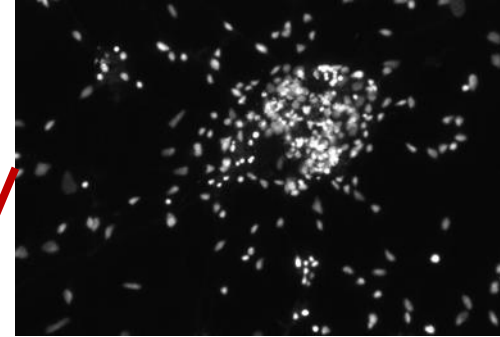
false color depth map



RxLive / 3D cross section measurement



False color stack of three fluorescence excitations



2D texture for each wavelength

False color depth map

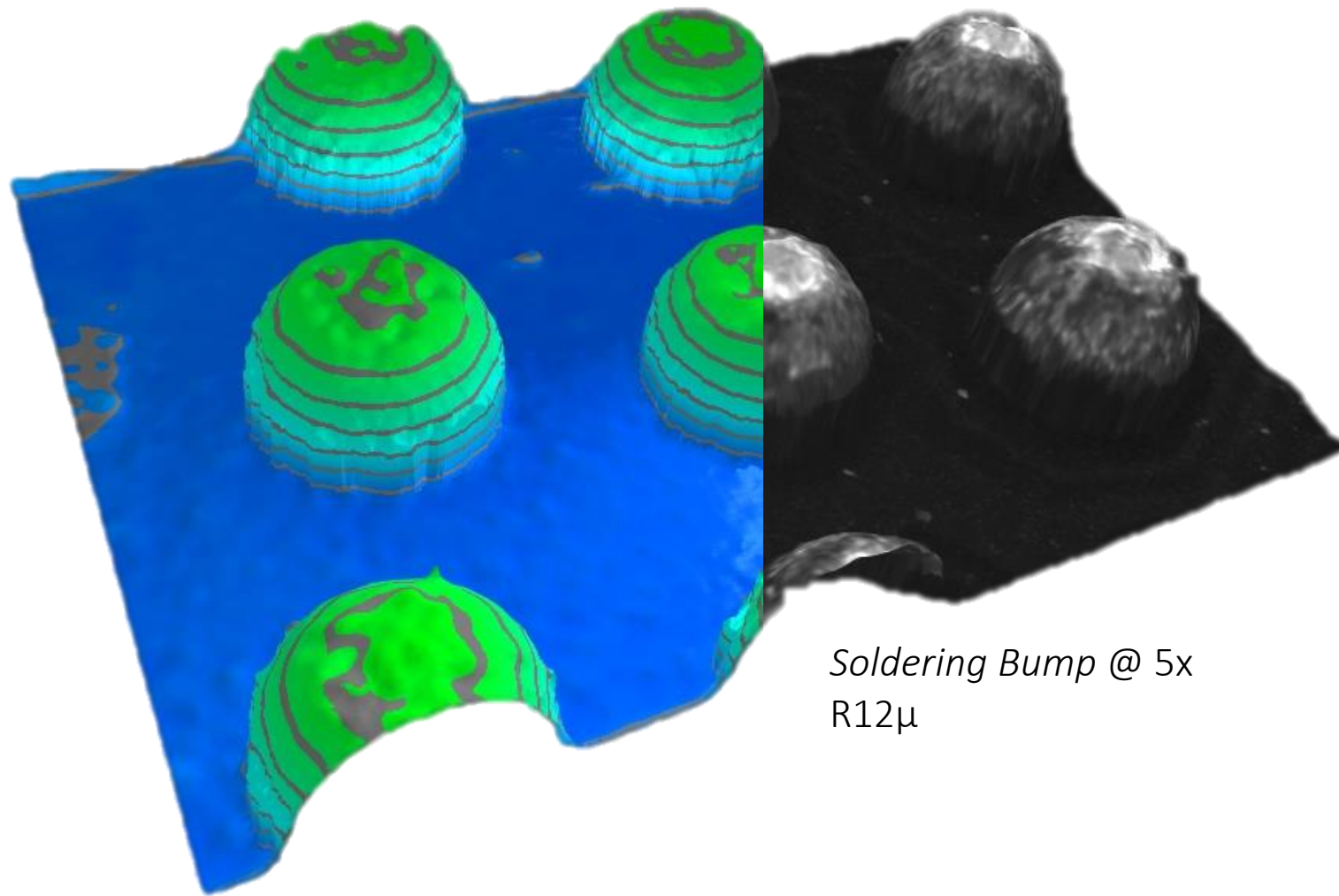
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light field for micro inspection

Why light field?





*Soldering Bump @ 5x
R12 μ*

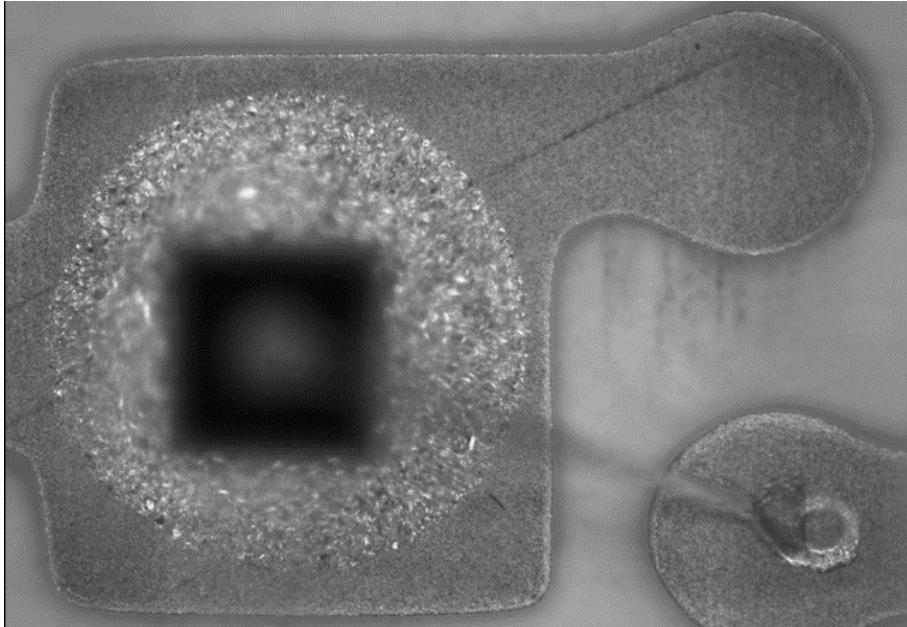
Light field in micro inspection

- extended Depth of Field
- occlusion free
- fast

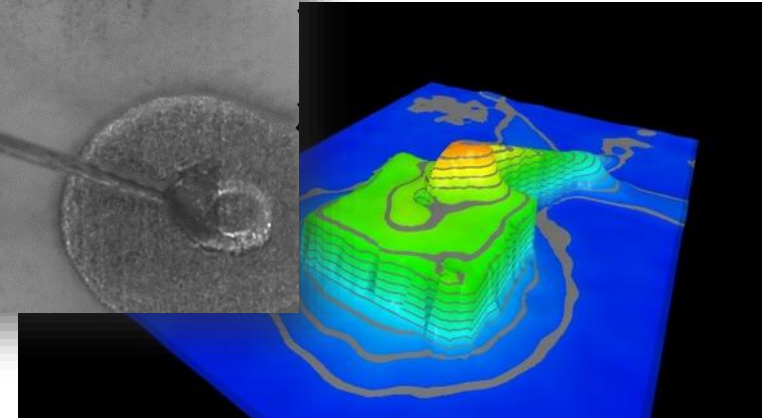
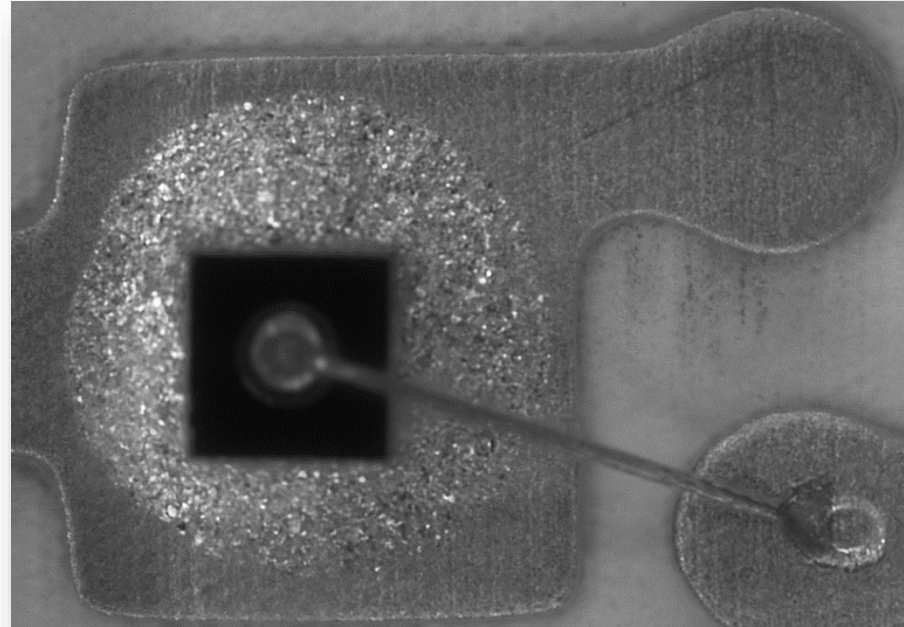
Extended Depth of Field

Bonding wire @ 10x

10MP 2D camera

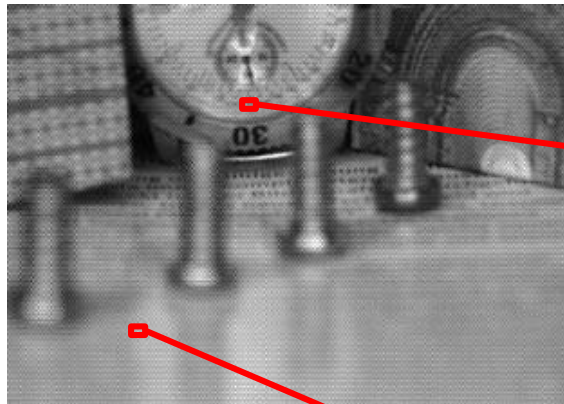


Raytrix light field camera R10μ

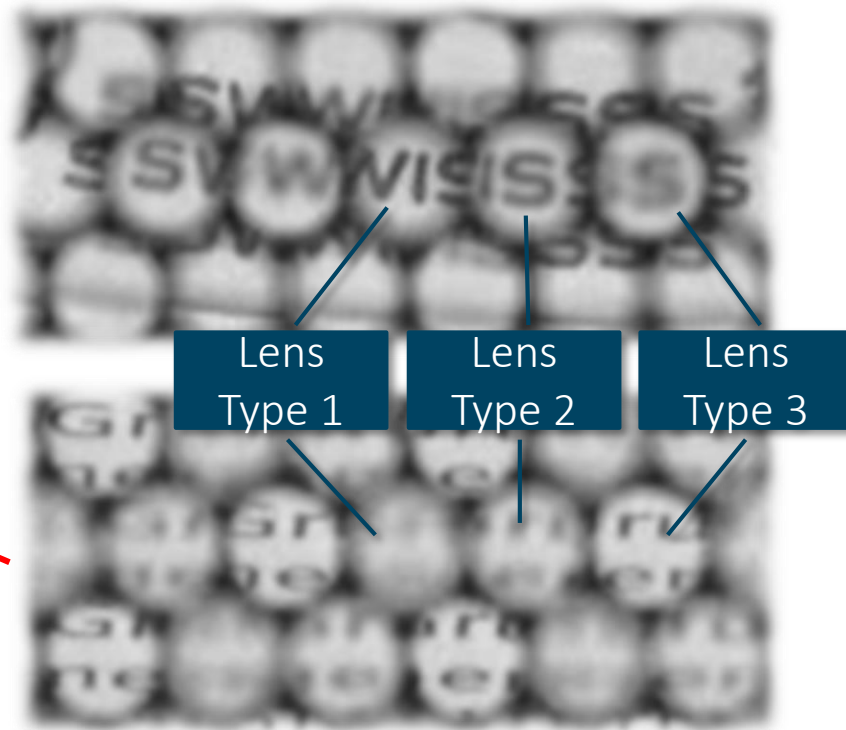


false color 3D model

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light field raw image

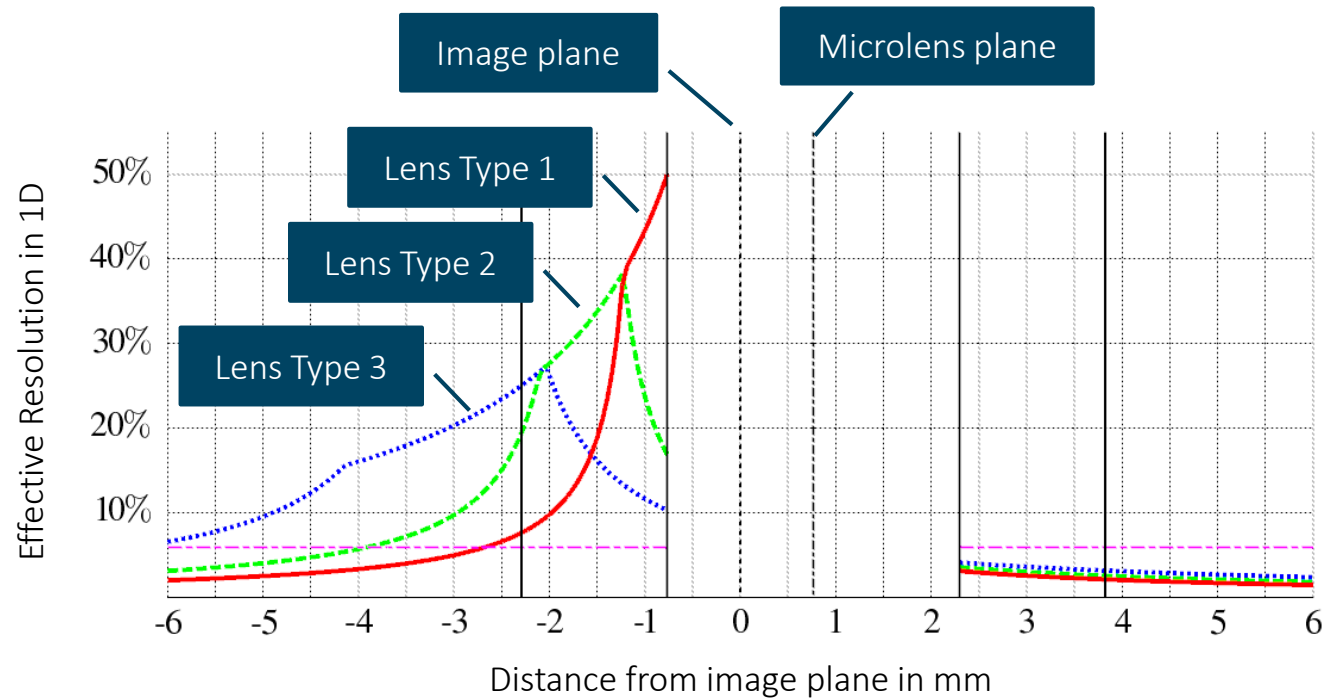


Extended Depth of Field

Three lens types are focused on different depths

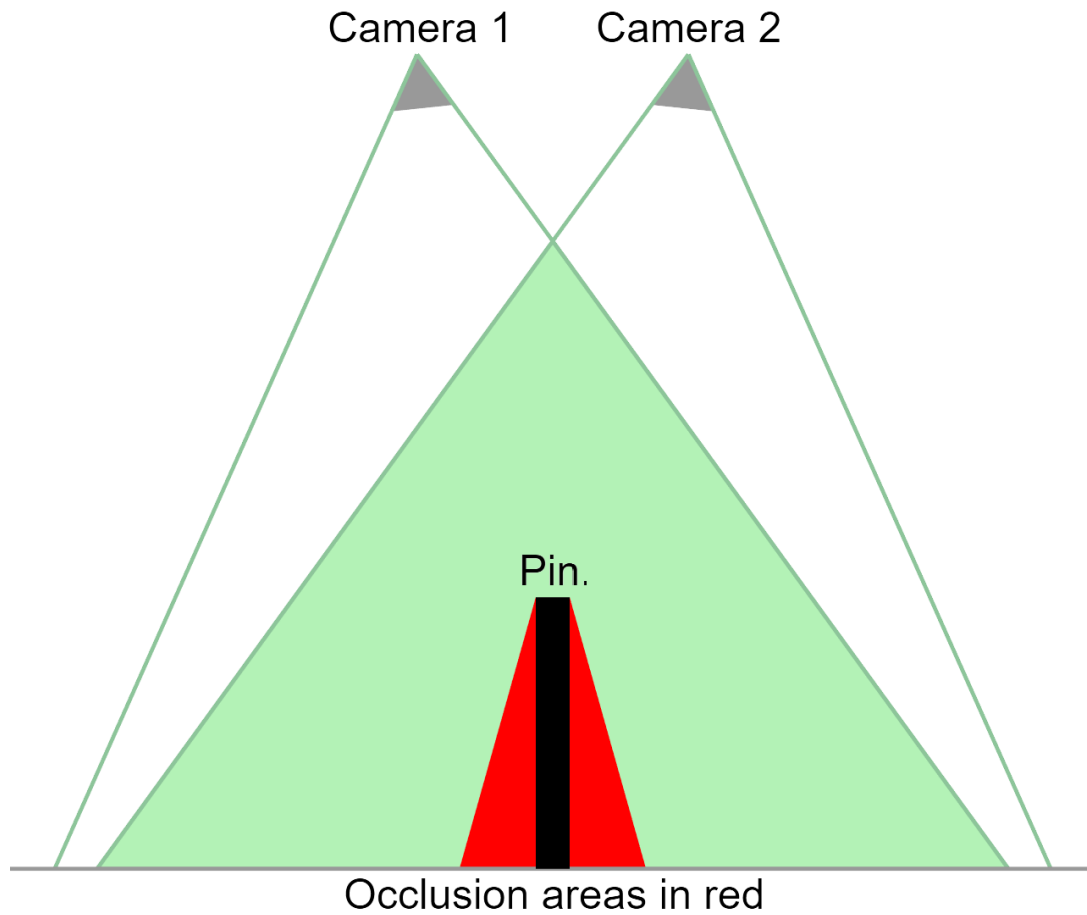
Extended Depth of Field

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

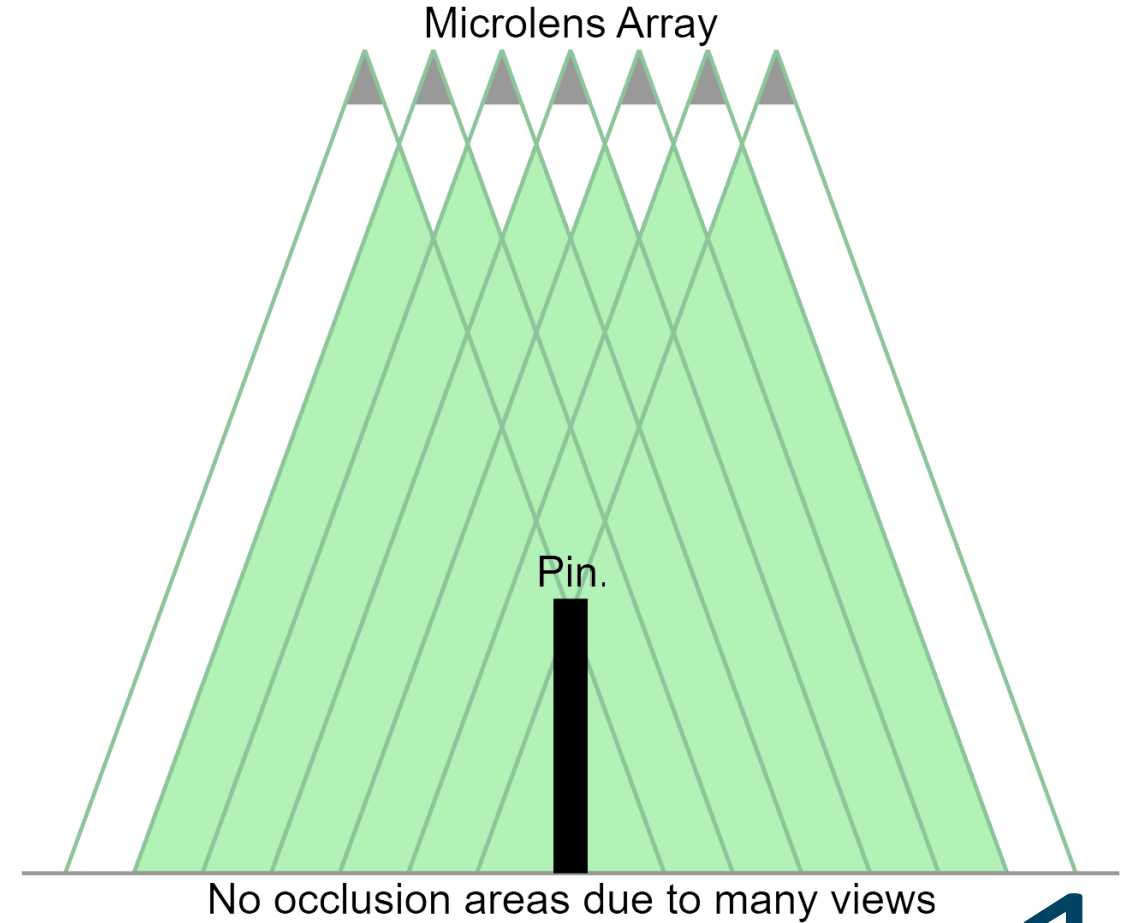


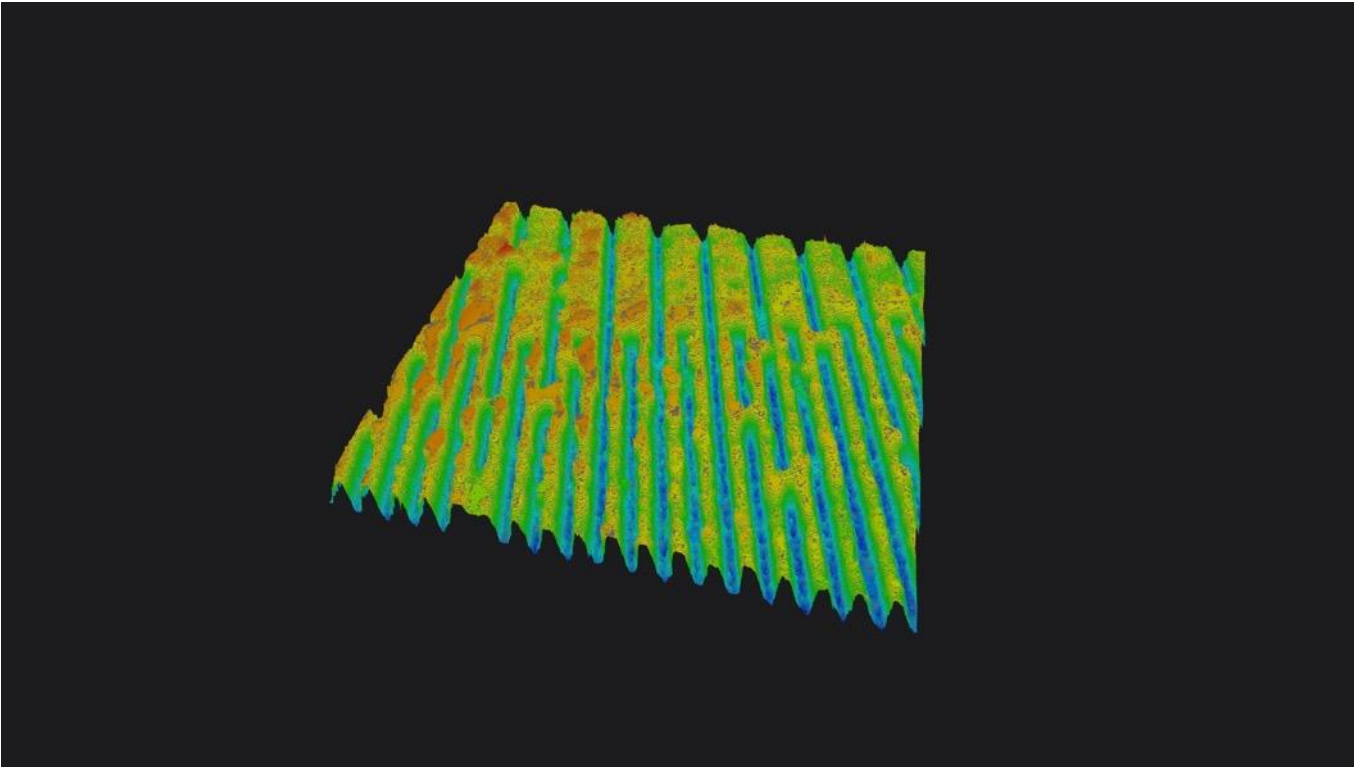
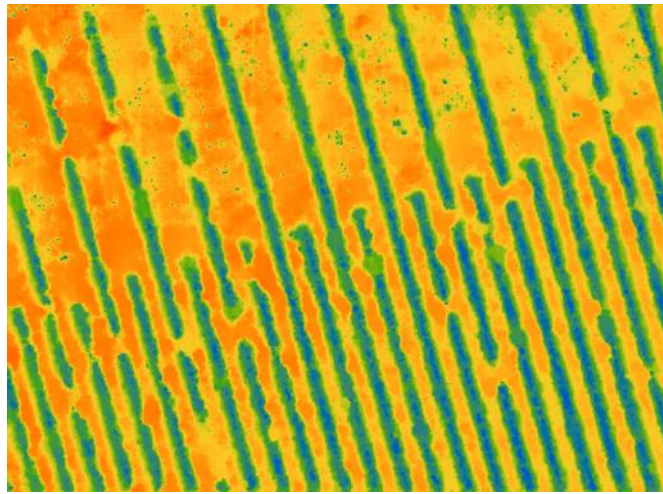
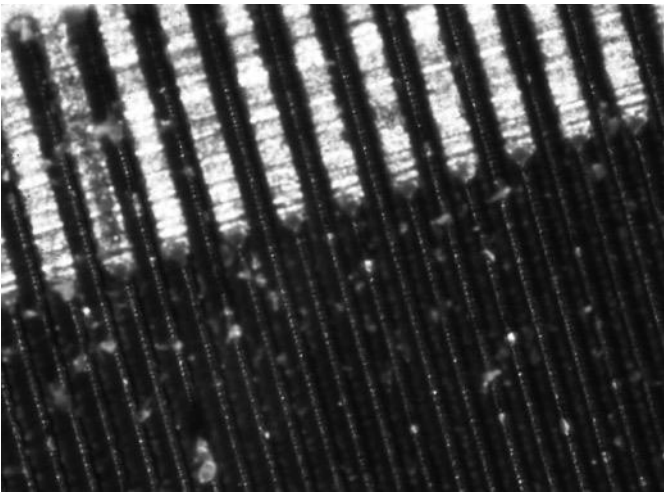
Occlusion

Stereo Camera System reconstructs pin as cone



Light Field Camera reconstructs pin as rectangle





PCB @ 1x
R12

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Occlusion

Every point in object space is imaged by multiple micro lenses, through which a light field camera is less susceptible to occlusion (foreground objects blocking the view) than comparable techniques. This results in sharper edges in the 3D Model.

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

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