

Materials List for

# Design and Building of a Customizable, Single-Objective, Light-Sheet Fluorescence Microscope for the Visualization of Cytoskeleton Networks

Nathan Felcher<sup>1</sup>, Daisy Achiriloaie<sup>1</sup>, Brian Lee<sup>2</sup>, Ryan McGorty<sup>3</sup>, Janet Sheung<sup>1,2,4</sup>

<sup>1</sup>W.M. Keck Science Department, Scripps College <sup>2</sup>W.M. Keck Science Department, Claremont McKenna College <sup>3</sup>Department of Physics and Biophysics, University of San Diego <sup>4</sup>W.M. Keck Science Department, Pitzer College

## Corresponding Author

Janet Sheung

JSheung@kecksci.claremont.edu

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jove.com/video/65411

## Materials

Name	Company	Catalog Number	Comments
1" Plano-Concave Lens f = -50 mm	Thorlabs	LC1715-A-ML	For alignment laser Estimated Cost: \$49.5
1" Achromatic Doublet f = 100 mm (x3)	Thorlabs	AC254-100-A-ML	L2, L4 and alignment laser Estimated Cost: \$342.42
1" Achromatic Doublet f = 125 mm	Thorlabs	AC254-125-A-ML	SL2 Estimated Cost: \$114.14
1" Achromatic Doublet f = 150 mm	Thorlabs	AC254-150-A-ML	L3 Estimated Cost: \$114.14
1" Achromatic Doublet f = 150 mm	Thorlabs	AC254-150-A-ML	TL2 Estimated Cost: \$114.14
1" Achromatic Doublet f = 45 mm	Thorlabs	AC254-045-A-ML	L1 Estimated Cost: \$114.14
1" Achromatic Doublet f = 75 mm	Thorlabs	AC254-075-A-ML	SL1 Estimated Cost: \$114.14
1" Cylindrical Lens f = 100 mm	Thorlabs	LJ1567RM	CL3 Estimated Cost: \$117.62
1" Cylindrical Lens f = 200 mm	Thorlabs	LJ1653RM	CL2 Estimated Cost: \$111.22
1" Cylindrical Lens f = 50 mm	Thorlabs	LJ1695RM	CL1 Estimated Cost: \$117.62
1" Mounted Pinhole, 30 µm Pinhole Diameter	Thorlabs	P30K	Estimated Cost: \$77.08
1" Silver Mirror (x3)	Thorlabs	PF10-03-P01	M1, M2, one for alignment Estimated Cost: \$168.78
2" Elliptical Mirror	Thorlabs	PFE20-P01	M3 Estimated Cost: \$179.98
2" Post Holder (x11)	Thorlabs	PH2	For custom laser mount, ND wheel, safety screens Estimated Cost: \$98.45
2" Posts (x47)	Thorlabs	TR2	For custom laser mount and optical components

			Estimated Cost: \$277.3
3" Posts (x4)	Thorlabs	TR3	For M3 supports and other mounts Estimated Cost: \$24.6
3" Post Holder (x4)	Thorlabs	PH3	Estimated Cost: \$38.48
30 to 60 mm Cage Adapter	Thorlabs	LCP33	To mount O1 Estimated Cost: \$45.42
30mm Cage Filter Wheel	Thorlabs	CFW6	To mount ND filters Estimated Cost: \$172.36
30mm Cage Plate (x6)	Thorlabs	CP33	To build alignment cage and alignment laser Estimated Cost: \$114.54
30mm Right-Angle Kinematic Mirror Mount (x3)	Thorlabs	KCB1	To mount M1 and M2 and for alignment laser Estimated Cost: \$463.95
4" Post Holder (x30)	Thorlabs	PH4	Estimated Cost: \$320.1
561 nm Laser and Power Supply	Opto Engine LLC	MGL-FN-561-100mW	Excitation laser Estimated Cost: \$6000
60mm Cage Plate (x2)	Thorlabs	LCP01	To mount TL1 and M3 mount Estimated Cost: \$88.52
60mm Right-Angle Kinematic Mirror Mount	Thorlabs	KCB2	To mount M3 Estimated Cost: \$187.26
90° Flip Mount	Thorlabs	TRF90	For alignment laser Estimated Cost: \$95.5
Adapter with External C-Mount Threads and Internal SM1 Threads	Thorlabs	SM1A9	To connect lens tube to camera Estimated Cost: \$20.96
Adapter with External SM1 Threads and Internal C-Mount Threads	Thorlabs	SM1A10	To connect tube lens to lens mount Estimated Cost: \$21.82
Adapter with External SM1 Threads and Internal M25 Threads (x2)	Thorlabs	SM1A12	To mount O1 and O2 Estimated Cost: \$47.06
Adapter with External SM1 Threads and Internal M26 Threads	Thorlabs	SM1A27	To mount O3 Estimated Cost: \$22.38
Alignment Disk	Thorlabs	SM1A7	Estimated Cost: \$20.45
Alignment Laser	BISKEE		<a href="https://www.amazon.com/Tactical-Presentation-Teaching-Interactive-Adjustable/dp/B09B1VXPNNM">https://www.amazon.com/Tactical-Presentation-Teaching-Interactive-Adjustable/dp/B09B1VXPNNM</a> Estimated Cost: \$16.98
Autofluorescent Plastic Slide, Red	Chroma	92001	Estimated Cost: \$20
Beam Shutter	Thorlabs	SM1SH1	To block laser light Estimated Cost: \$65.8
Cage Rotation Mount (x3)	Thorlabs	CRM1T	To mount CL1-3 Estimated Cost: \$282.15
Cage System Rods 1" (x8)	Thorlabs	ER1	To mount M3 and O1 Estimated Cost: \$44.8
Cage System Rods 3" (x2)	Thorlabs	ER3	To mount O3 Estimated Cost: \$14.28
Cage System Rods 4" (x4)	Thorlabs	ER4	To mount slit Estimated Cost: \$30.76
Cage System Rods 8" (x2)	Thorlabs	ER8	For tube lens alignment Estimated Cost: \$25.3
Cage System Rods 12" (x8)	Thorlabs	ER12	For alignment cage Estimated Cost: \$145.36
Camera	Andor	Zyla 4.2 sCMOS	Estimated Cost: ~\$14,000
Clamping Fork (x35)	Thorlabs	CF125	To clamp down post mounts Estimated Cost: \$338.8
Cover Glass, 22 x 22 mm	Corning	2850-22	For slide samples Estimated Cost: \$265
Dichroic	AVR	DI01-R405/488/561/635-25x36	To split excitation/emission paths

			Estimated Cost: \$965
Dovetail Translation Stage	Thorlabs	DT12	To translate pinhole Estimated Cost: \$90.55
Emission Filter	Thorlabs	FELHO600	Estimated Cost: \$140.99
Frosted Glass Alignment Disk (x2)	Thorlabs	DG10-1500-H1	For alignment cage and intermediate plane Estimated Cost: \$75.14
Function Generator	Hewlett-Packard	HP 33120A 15 MHz	To control galvo Estimated Cost: \$900
Galvanometer - 1D Large Beam Diameter System	Thorlabs	GVS011	Estimated Cost: \$1715.78
Galvanometer Power Supply	Siglent	SPD3303C	Estimated Cost: \$300
Gelrite	Research Products International	G35020-100.0	Gellan gum for 3D bead sample Estimated Cost: \$68.25
FIJI Software	Open-source		Download from <a href="https://imagej.net/software/fiji/downloads">https://imagej.net/software/fiji/downloads</a> Estimated Cost: Free
Hot Plate/ Stirrer	Corning	6795-220	For preparing sample solutions Estimated Cost: \$550
K-Cube Brushed Motor Controller	Thorlabs	KDC101	Drives Z825B Estimated Cost: \$757.51
Kinematic Mount	Thorlabs	KM100S	To mount dichroic Estimated Cost: \$92.01
Kinesis Software	Thorlabs		Download from <a href="https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=10285">https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=10285</a> Estimated Cost: Free
Laser Light Blocker	Thorlabs	LB1	For ND filter reflections Estimated Cost: \$57.65
Laser Mount	custom made		3D printed Estimated Cost: N/A
Laser Safety Screen (x2)	Thorlabs	TPS4	For blocking stray laser light Estimated Cost: \$92.02
Laser Scanning Tube Lens	Thorlabs	TTL200MP	TL1 Estimated Cost: \$1491
Lens Mount (x10)	Thorlabs	LMR1	To mount all lens and extra alignment mirror. Estimated Cost: \$164.7
Magnetic Ruler	Thorlabs	BHM4	To check alignment Estimated Cost: \$52.74
Micro-Manager Software	Open-source		Download from <a href="https://micro-manager.org/Download_Micro-Manager_Latest_Release">https://micro-manager.org/Download_Micro-Manager_Latest_Release</a> Estimated Cost: Free
Microscope Slides	Thermo Fisher Scientific	12550400	For slide samples Estimated Cost: \$123.9
Microscope Stage	ASI	FTP-2000 with custom parts	To fine-translate samples Estimated Cost: ~\$16,000
Mini Vortex Mixer	VWR	10153-688	For sample preparation Estimated Cost: \$152.64
Motorized Actuator	Thorlabs	Z825B	To fine-translate M1 Estimated Cost: \$729.07
Mounted Standard Iris (x2)	Thorlabs	ID20	At least 2 for alignment Estimated Cost: \$118.02
ND Filter Set	Thorlabs	NDK01	To reduce excitation intensity Estimated Cost: \$726.73
Objective Lens 1	Nikon	Plan Apo 60X/ 1.20 WI	O1 Estimated Cost: ~\$15,000

Objective Lens 2	Nikon	TU Plan Fluor 100X/0.90	O2 Estimated Cost: ~\$6,000
Objective Lens 3	Mitutoyo	Plan Apo HR 50X/0.75	O3 Estimated Cost: ~\$6,800
OPM Deskewing Software	Open-source		For image processing. Download from <a href="https://github.com/QI2lab/OPM">https://github.com/QI2lab/OPM</a> Estimated Cost: Free
Photodiode Power Sensor	Thorlabs	S121C	For measuring laser intensity Estimated Cost: \$379.68
Positive Grid Distortion Target	Thorlabs	R1L3S3P	Brightfield alignment Estimated Cost: \$267.87
Power Meter Digital Console	Thorlabs	PM100D	For measuring laser intensity Estimated Cost: \$1245.48
Rhodamine 6G	Thermo Scientific	J62315.14	For fluorescent coated slide sample Estimated Cost: \$27.7
Right-Angle Clamp for Posts	Thorlabs	RA90	For M3 support and flip down mirror Estimated Cost: \$32.46
RMS-Threaded Cage Plate (x2)	Thorlabs	CP42	For alignment laser Estimated Cost: \$70.56
Shear Plate 2.5-5.0 mm	Thorlabs	SI050P	Estimated Cost: \$182.85
Shear Plate 5.0-10.0 mm	Thorlabs	SI100P	Estimated Cost: \$201.47
Shear Plate 10.0-25.4 mm	Thorlabs	SI254P	Estimated Cost: \$236.42
Shear Plate Viewing Screen	Thorlabs	SIVS	Estimated Cost: \$337.74
Shearing Interferometer with 1-3 mm Plate	Thorlabs	SI035	For checking collimation Estimated Cost: \$465.85
Slip-On Post Collar (x35)	Thorlabs	R2	To maintain post height Estimated Cost: \$208.25
Slit	Thorlabs	VA100	Estimated Cost: \$294.64
Slotted Lens Tube, 3"	Thorlabs	SM1L30C	For alignment laser Estimated Cost: \$77.45
Square Mirror, 1 x 1"			<a href="https://www.amazon.com/Small-Square-Mirror-Pieces-Mosaic/dp/B07FBNMDC1/?tag=hyprod-20&amp;linkCode=df0&amp;hvadid=642191768069&amp;hvpos=&amp;hvnetw=g&amp;hvrand=13367349119004374691&amp;hvpone=&amp;hvpstwo=&amp;hvmqmt=&amp;hvddev=c&amp;hvdvcmdl=&amp;hvlocint=&amp;hvlocphy=9031212&amp;hvtargid=pla-1943952718742&amp;gclid=Cj0KCQiA6LyfBhC3ARIsAG4gkF_AYBpn5EdGLq3mc-RU-nant5vM4ac9r3-obbzqJoWKPkiPIJU6e1caAjWmEALw_wcB&amp;th=1">https://www.amazon.com/Small-Square-Mirror-Pieces-Mosaic/dp/B07FBNMDC1/?tag=hyprod-20&amp;linkCode=df0&amp;hvadid=642191768069&amp;hvpos=&amp;hvnetw=g&amp;hvrand=13367349119004374691&amp;hvpone=&amp;hvpstwo=&amp;hvmqmt=&amp;hvddev=c&amp;hvdvcmdl=&amp;hvlocint=&amp;hvlocphy=9031212&amp;hvtargid=pla-1943952718742&amp;gclid=Cj0KCQiA6LyfBhC3ARIsAG4gkF_AYBpn5EdGLq3mc-RU-nant5vM4ac9r3-obbzqJoWKPkiPIJU6e1caAjWmEALw_wcB&amp;th=1</a> Estimated Cost: \$14.76
Stackable Lens Tube 1/2" (x3)	Thorlabs	SM1L05	To mount CL1-3 Estimated Cost: \$40.86
Stackable Lens Tube 1"	Thorlabs	SM1L10	To mount O3 Estimated Cost: \$15.41
Stackable Lens Tube 2" (x2)	Thorlabs	SM1L20	For camera path Estimated Cost: \$35.7
Studded Pedestal Base Adapter (x37)	Thorlabs	BE1	To attach post mounts to table Estimated Cost: \$400.71
Translating Lens Mount (x3)	Thorlabs	LM1XY	To fine-translate pinhole, O2 and O3 Estimated Cost: \$441
Translation Stage with Standard Micrometer (x2)	Thorlabs	PT1/M	TS1-2 Estimated Cost: \$647.54
Travel Manual Translation Stage	Thorlabs	CT1A	O3 cage translation mount

			Estimated Cost: \$497.3
Tube Lens	Nikon	MXA20696	TL3 Estimated Cost: \$359
White Mounted LED	Thorlabs	MNWHL4	Brightfield light source Estimated Cost: \$171.28
			TOTAL ESTIMATED COST: \$84,858.98
			The authors note that many parts were bought used. Here, we have attempted to reflect the retail price of all items, so the total cost can be greatly reduced by buying particular items used, especially the more expensive ones.
OPTIONAL COMPONENTS			
Grasshopper3 USB3	FLIR	GS3-U3-23S6C-C	For diagnostic checks during alignment. Acquisition camera can be used instead, but requires realignment afterwards. Estimated Cost: \$1089