



iDigBio

Integrated Digitized Biocollections

Imaging Workstations and Software

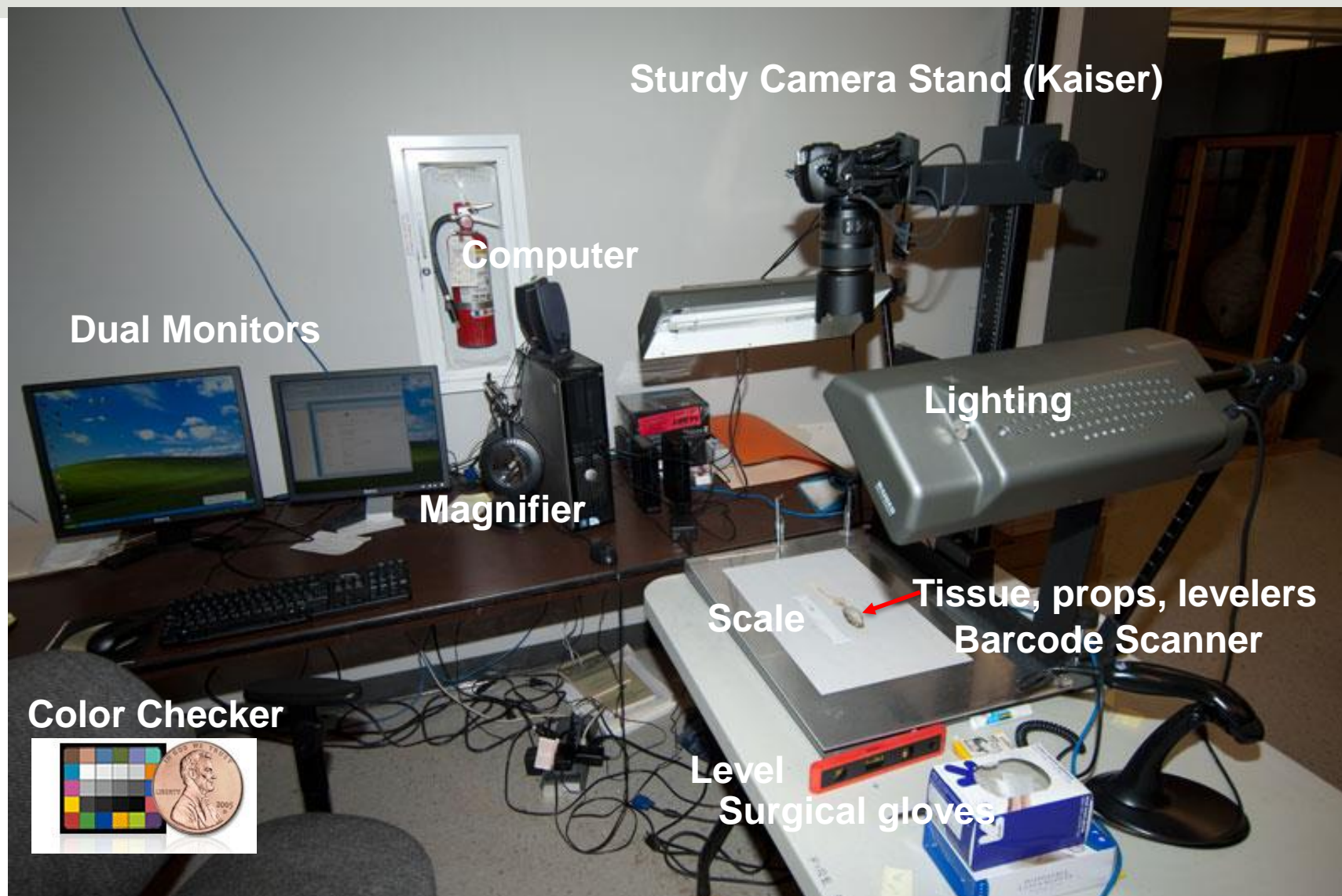
3 May 2017

Florida Museum of Natural History

Gil Nelson, iDigBio/Florida State University
Stephanie Leon, Archbold Biological Station



iDigBio is funded by a grant from the National Science Foundation's Advancing Digitization of Biodiversity Collections Program (Cooperative Agreement EF-1115210). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. All images used with permission or are free from copyright.



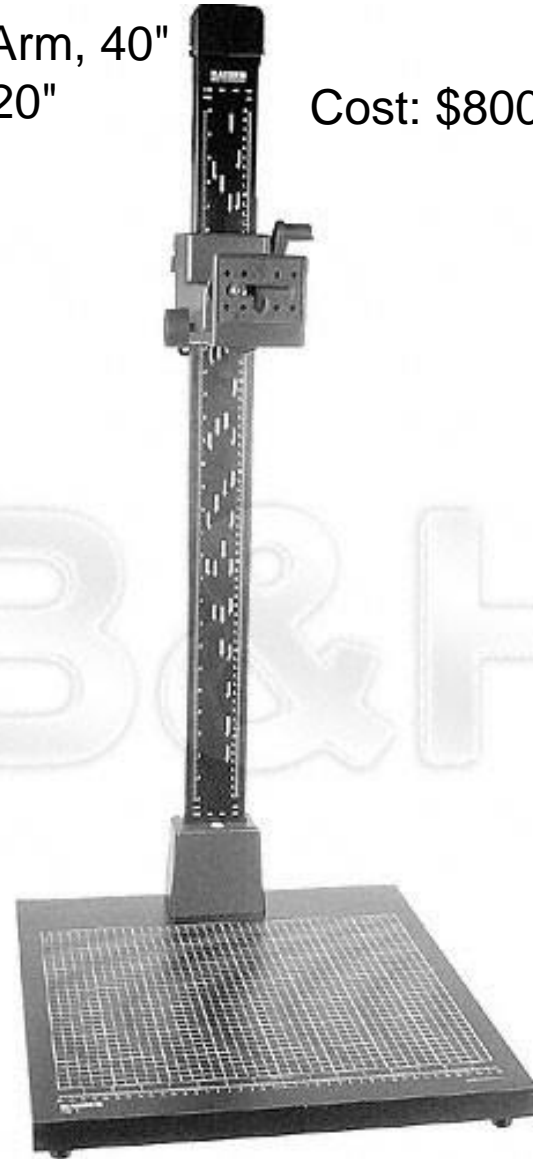
Imaging station

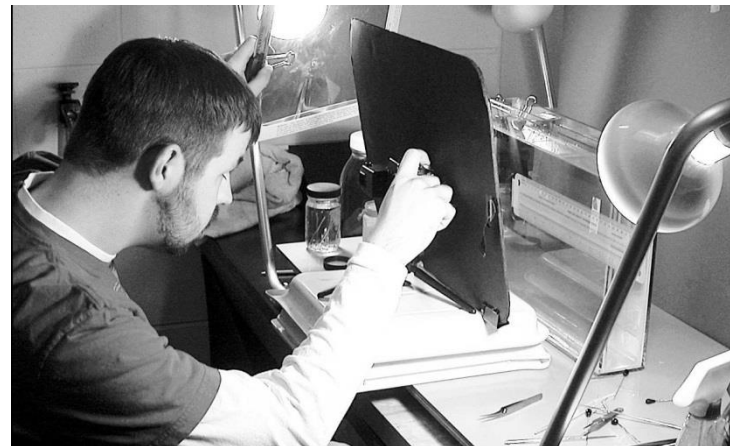


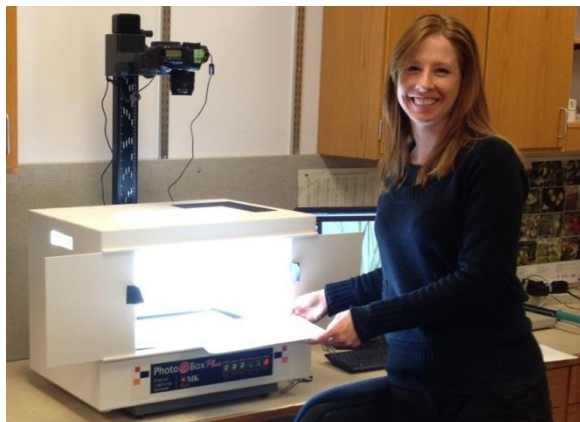
Kaiser Copy Stand RS 1 with RA-1 Arm, 40"
Counterbalanced Column and 18 x 20"
Baseboard

Cost: \$800.00

Kaiser RB 5000 Daylight Copy Light Set
with Two 36 Watt 5400K Fluorescent
Tubes
Cost: \$1100.00

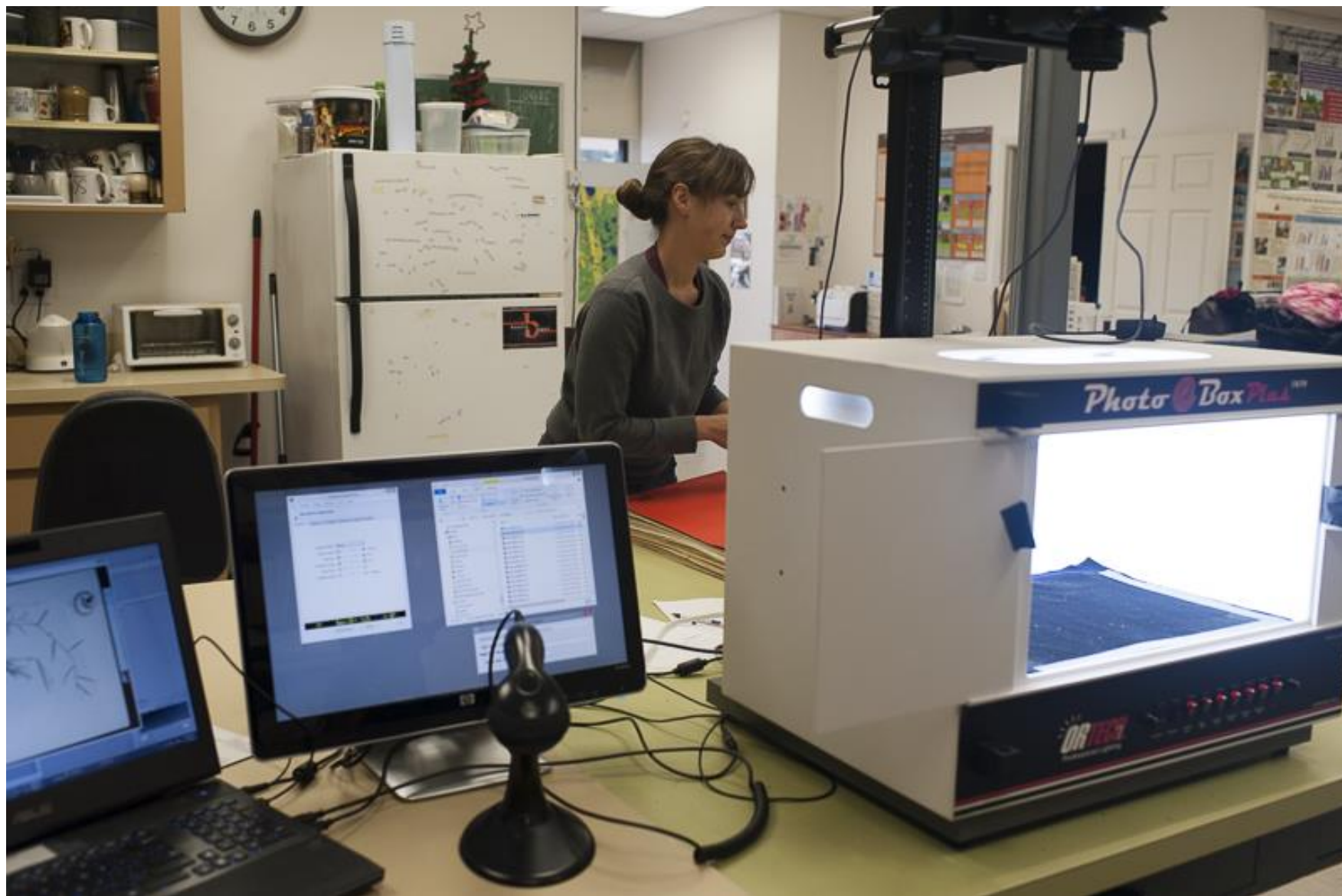






No longer available
Box cost: \$1700.00
Stand cost: \$800.00



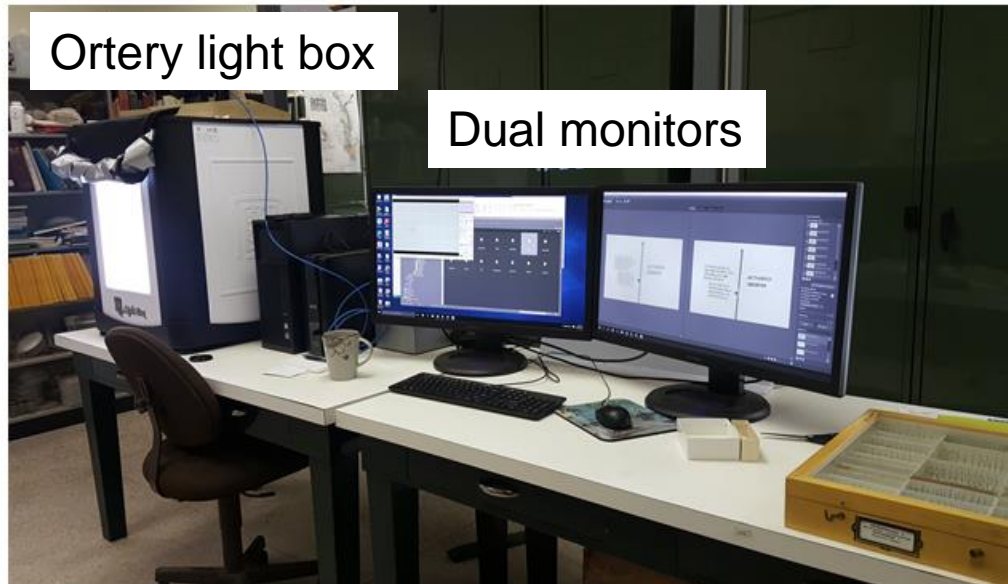


Ortery Photosimili

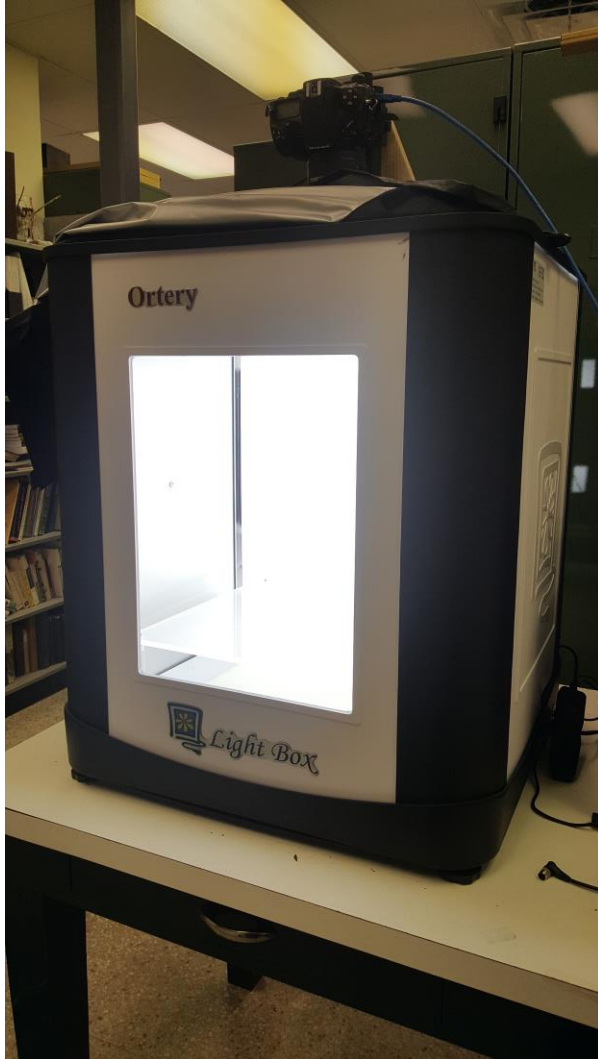
Current cost,
About \$3200.00



The Archbold Setup:
Nikon D810, 36.3 MP
Ortery Photosimile
Camera Control Pro 2/ Helicon Remote
Helicon focus stacking software



Photosimile 50 includes:



- Acrylic table
- 4 column lights for each corner
- 2 column lights/1 back panel light
- Uniform daylight (6,500K) illumination from each corner
- Top and side shot capabilities
- Built in power and USB ports inside the studio for turntable or other accessories
- Plastic built studio with long 15,000 hour lamp life
- Fabric door cover keeps contaminate light out when taking side shots

Item	Supplier	Description	URL	Budget cost	Cost	Notes
Camera Needs						
Nikon D810 SLR 36.3 Megapixel full-frame digital camera	Nikon	The value of specimen images depends entirely on the fineness of resolution of the images taken, to allow on-line study of very small but taxonomically and morphologically important specimen characteristics (e.g., plant trichomes, insect setae, feather patterns, etc.). The requested camera will provide state-of-the-art resolution, color, and clarity in providing a permanent record of specimens for biological research in years to come.	http://www.nikonusa.com/en/nikon-products/product/camera/camera/0810.html			
Nikon AF-S Micro-Nikkor 60mm f/2.8G ED Macro Autofocus Lens	Nikon	This lens is required for taking high-resolution images of larger items, to include plant and vertebrate specimens	http://www.nikonusa.com/en/nikon-products/product/camera-lenses/af-s-micro-nikkor-60mm-f2.8g-ed.html	\$3,300.00	\$2,986.95	
Nikon AF-S VR Micro-Nikkor 105mm f/2.8G IF-ED Lens	Nikon	This lens is required for close-up photographs of insects.	http://www.nikonusa.com/en/nikon-products/product/camera-lenses/af-s-vr-micro-nikkor-105mm-f2.8g-ed.html	\$550.00	\$586.00	
Nikon AF-S NIKKOR 24-120mm f/4G ED VR Lens for increased versatility and cost savings	Nikon	This lens is required for images of larger vertebrate specimens, such as bobcats, bears, large herons, eagles	http://www.nikonusa.com/en/nikon-products/product/camera-lenses/af-s-nikkor-24-120mm-f4g-ed-vr.html	\$900.00	\$886.95	
Induro Carbon 8X CT Tripod and BHD1 dual-action ballhead	Nikon	Required for stable image capture of any images not taken on light stands	http://www.bhphotovideo.com/c/product/1055219_1055219-01/induro-471-113-Carbon-8X-CT113-Tripod.html	\$1,260.00	\$1,086.95	
Kenko extension tube set	Amazon	For imaging very small specimens		\$490.00	\$490.00	
Nikon Camera Control Pro 2	Nikon	Software enables simplified remote control of many Nikon digital SLR functions from a personal computer, provides a simple trigger function and can activate the bulb function on certain Nikon SLR cameras.	http://www.nikonusa.com/en/nikon-products/product/imaging-software/camera-control-pro-2--full-version-downloads.html		\$180	
Nikon MC-36A Multi-Function Remote Cord for image stability	Nikon		http://www.amazon.com/NIKON-Multi-Function-Remote-Cord-33-5-inches/dp/B000Y9C372	\$160.00	\$160	
Total Camera Equipment					\$6,076.85	
Image Capture Materials						
Ortery Photosimile 50 - Product Studio Lighting	B & H Photo Video ProAudio	Controlled lighting studios and software enables for an efficient	http://www.bhphotovideo.com/c/product/1095583_1095583-01/ortery-photosimile-50-product-studio-light.html	\$1,500.00	\$2,161.21	
Kirk FR-2 Focusing Rail for fine focusing adjustments	B & H Photo Video ProAudio	For precise camera to specimen focusing	http://www.bhphotovideo.com/c/product/1055272_1055272-01/kirk-fr-2-focusing-rail.html	\$300.00	\$300.00	
Total Costs:					\$2,461.21	Total
Data processing and storage materials						
Hp z240 Processor	Insight	For image and data capture	http://www.insight.com/en_US/products/9675917HP%20Z240%20CPU%20HP-2240-%20Xeon-E31240V5-35-GB-8-GB-1-TR	\$1,200.00	\$1,130.99	
Dell Latitude laptop for image processing	Dell	For image processing	http://dx.doi.org/10.1016/j.jbi.2016.03.001		\$1,139.00	
2 x 28 inch monitor with color controls for evaluating images	Insight	For evaluating images	http://www.insight.com/en_US/products/9675917HP%20Z240%20CPU%20HP-2240-%20Xeon-E31240V5-35-GB-8-GB-1-TR	\$500.00	\$619.98	
PhotoShop CS Creative Cloud software for processing images	See url	\$10/month or \$360 for three years	http://www.adobe.com/products/photoshop.html?cid=ac04&source=adobe_keywords&ref=adobe.com/creativecloud/ps/subscribe/ps/subscribe.html	\$360.00	\$360.00	
Lightroom CS Creative Cloud Software for processing images	See url	\$10/month or \$360 for three years				included in creative cloud
Helicon Focus stacking software	See url	\$55/year or \$200 unlimited	http://www.heliconsoft.com/heliconsoft-products/helicon-focus/	\$200.00	\$200.00	
Total Costs				\$2,260.00	\$2,260.00	
TOTAL OVERALL COSTS:					\$10,798.06	

FotodioX LED Studio-in-a-Box (28 x 28"), 5600K, CRI=85



Cost: \$120.00

Impact Digital Light Shed - Extra Large - (24 x 24 x 36")



Cost: \$70.00

Light

Optimal light source: Inexpensive, continuous, low heat output (for people and specimens), daylight color temperature (5000-5600 Kelvin), smooth spectral curve.

Color rendering index (CRI): >90 is best

Continuous light source types:

- Incandescent (hotter, smooth spectral curve; CRI=100)
- Fluorescent (less smooth spectral curve, cooler, CRI= \sim >90)
- LED (less smooth curve; CRI=80-90, some claims of 98; gradual loss of brightness)

Experiment with angle of lighting

Adjust lighting for specimen

Color checker:



Managing Extraneous Light

Avoid natural light from outside (windows, skylights, doors, etc.)

Dim or eliminate fluorescent lighting from overhead to reduce interference with studio florescent lighting (electromagnetic interference or EMI)

Ensure that all light illuminating specimen is balanced and of the same color temperature

Accessories

Hand sanitizer (multiple uses)

Extra fluid (ethanol)

Surgical gloves

Tweezers

Tongs

Level(s)

Chocking material for positioning specimens

Whitening and/or blackening agents (especially for fossils)

Tripod

Step ladder

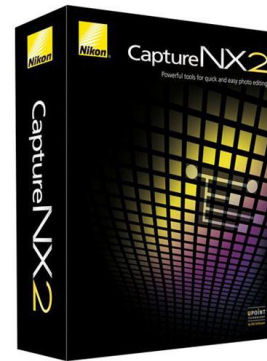
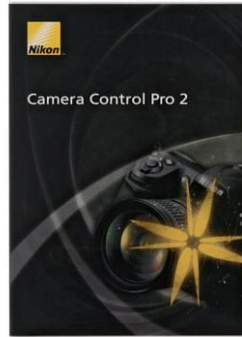
Flashlight

Toolset (pliers, screwdrivers, etc.)

Digital gray card

Camera Control Software for Tethering/Processing

Nikon Camera Control Pro



Canon Digital Photo
Professional/EOS Utility



DigiCamControl



digiCamControl

Image capture: Camera Control Pro 2

Live View (Normal area)

AF: autofocus, by placing the red square on a particular area and clicking AF, the camera will automatically focus on selected area

Plus and minus signs help with fine focus. These are what I use when doing stacks...

Start takes an image of what you see on the screen, whether it was manually focused or not

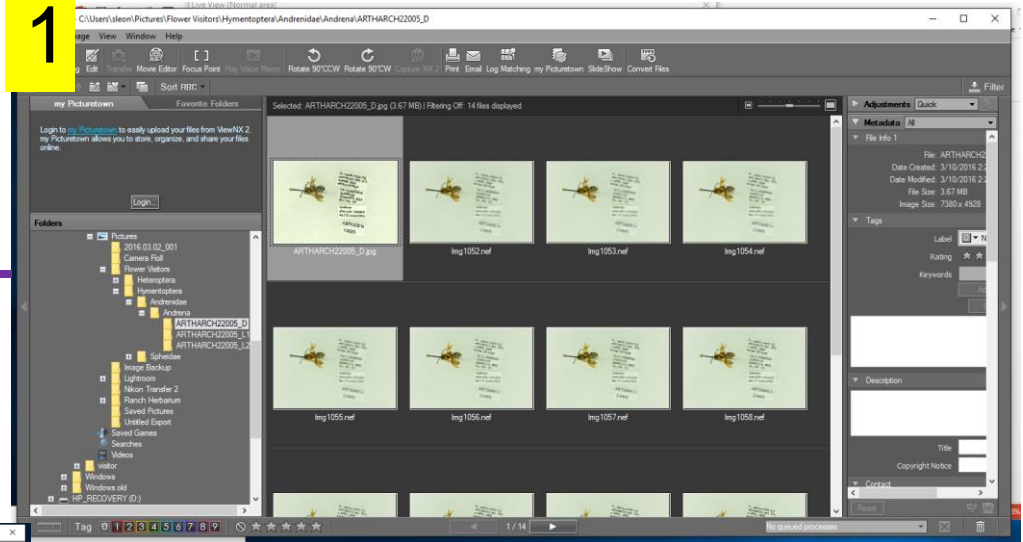
AF and Start will autofocus and image, even if you had focused with plus and minus already.

Archbold Biological Station	N27°10.50'	W081°21.00'	Hym	Andrenidae	<i>Andrena</i>	<i>fulvipennis</i>	AB
Archbold Biological Station	N27°10.50'	W081°21.00'	Hym	Andrenidae	<i>Andrena</i>	<i>fulvipennis</i>	AB

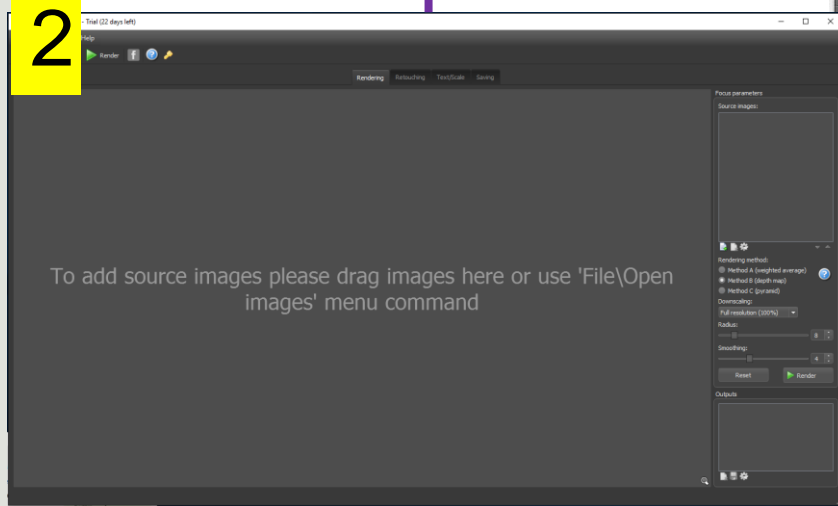
Image capture

- Images will appear in View NX2
- Once all images are taken,
- Highlight them all and place them into Helicon Focus

1

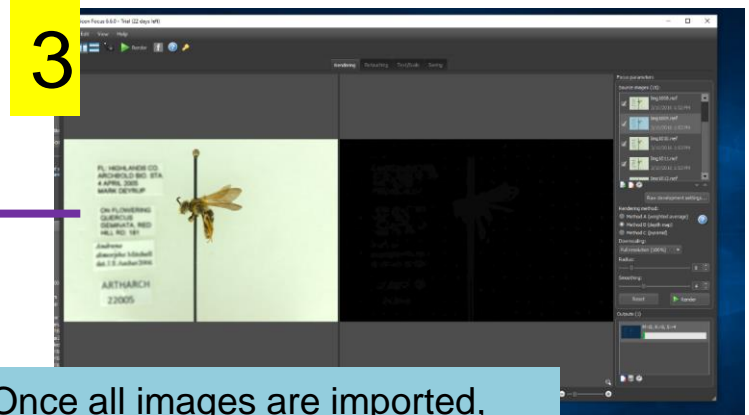


2



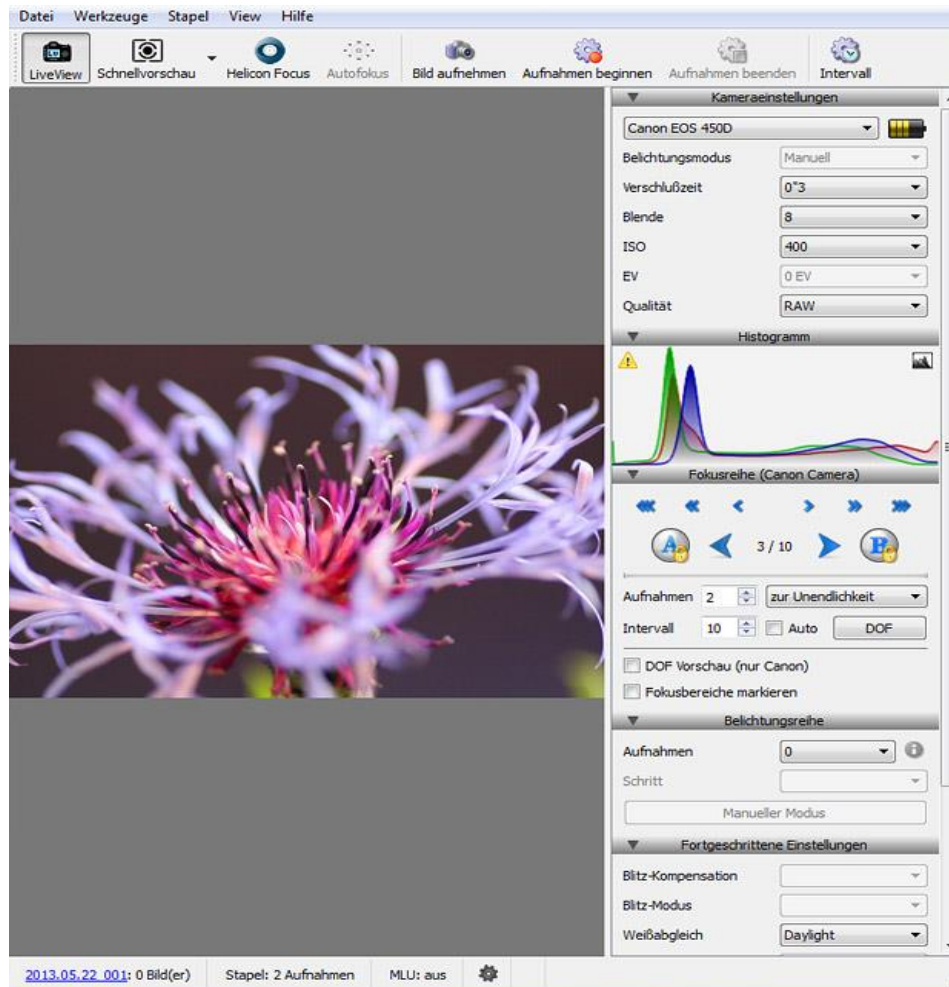
To add source images please drag images here or use 'File/Open images' menu command

3

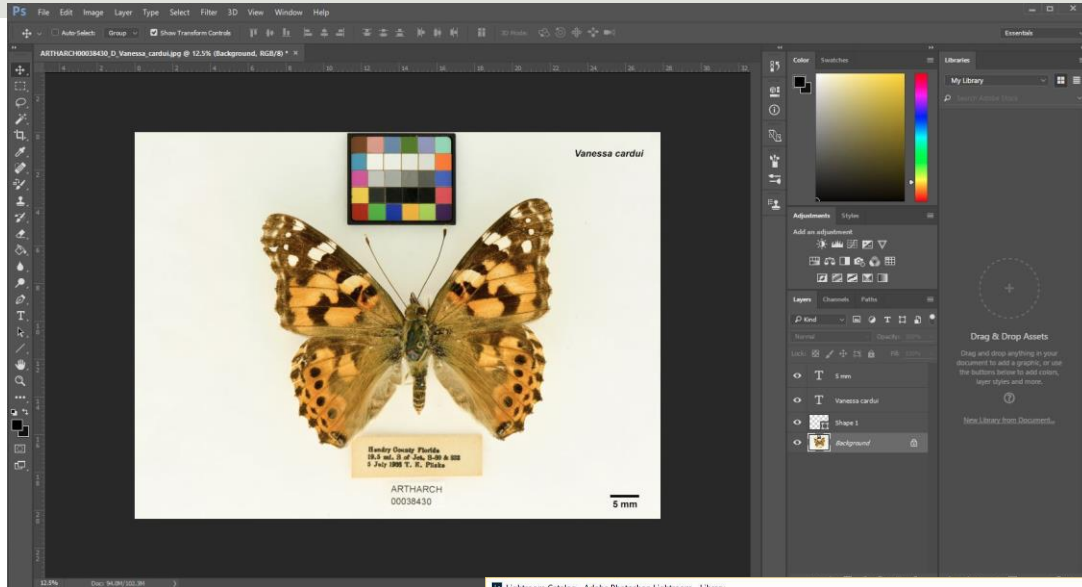


- Once all images are imported, click on render
- After image has been compiled, right click and save

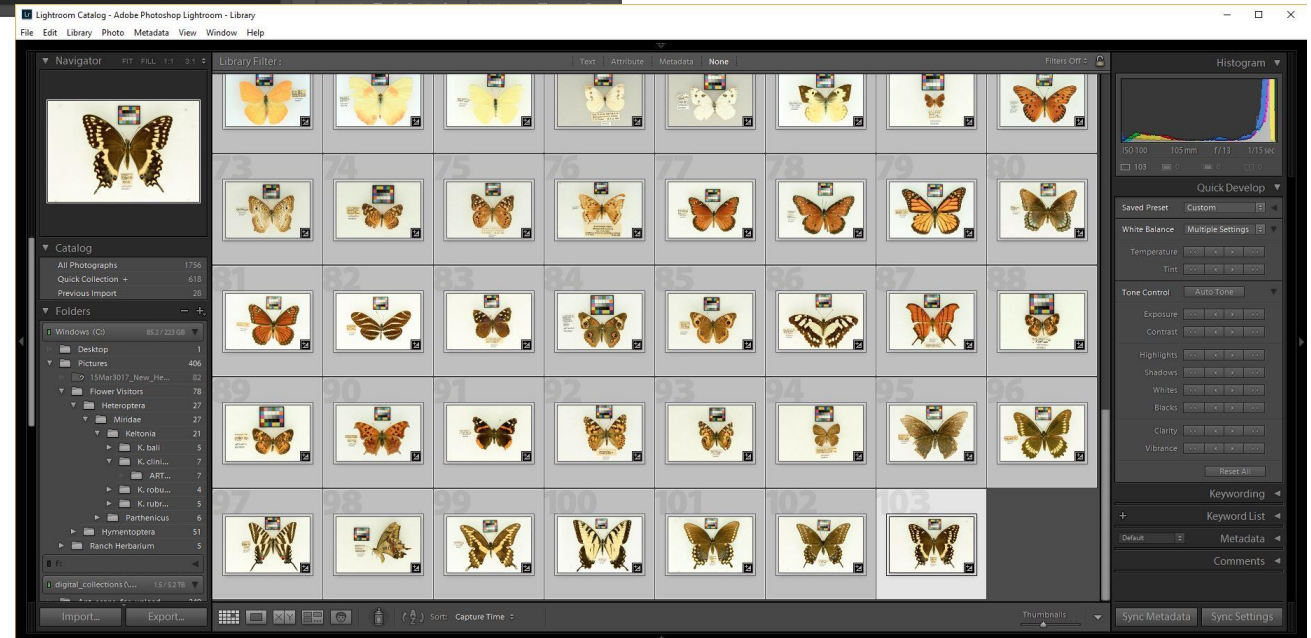
Image capture: Helicon Remote



- Very similar to Control Pro
- Compatible with Cannon and Nikon
- Automated Focus
- Automatic stacking with helicon focus



Photoshop



Light room





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