Focus stacking and Bracketing

Focus stacking all done in camera, where the camera software takes and combines the photos to make the final image.

Focus bracketing, the photographer uses the camera to take a set of photos focused at different distances. These are then combined on a PC using software such as Photoshop, Luminar Neo, Zerene Stacker or Helicon Focus.

Methods for Focus Bracketing

1. Fully manual you press the shutter (use a cable release) and then move either the focus or the camera, pause for a few seconds and then take the next photo. You will probably need to set your camera/lens to manual focus. For high magnification you will need a focus rail.
2. Semi-automatic - you set the camera to a high frame rate, press and hold the shutter while you either manually adjust the focus or slowly move the camera forward (or back and forth depending on your control ability!
3. Fully automatic - you set the number of exposures, and the focal increment between exposures, then press the button to start the sequence and let the camera change the focus for you.

A tripod, usually with a focusing rail, will give best results; however, for moving animals like insects or spiders you may not have the time to set this, and so in general I use a braced hand held technique, or a monopod - both of these can require a fair bit of practice!
It's helpful to have focus peaking turned on if it's available.

The easiest way for close-up, rather than true macro is to use a moderately high f-stop to get a reasonable depth of field, and then use your touch screen for manual focus, and gradually work your way through the subject. You can also do this by manually rotating your focus ring in small increments if you lack a touch screen.

My method - often varies a bit due to forgetfulness and/or awkward positioning

1. Take a test shot to check exposure etc -for manual stacking I will tend to use a higher f-stop value to give better overlap of the sharp areas.
2. Set camera parameters (no of shots, focus increment, pause/delay) if you are using in camera bracketing or stacking.
3. Use back-button focus, or manual focus, to set the point of focus on the closest section you want to be sharp - often a little in front of the subject.
4. If you are using a manual method:
    a. Make sure you have set manual focus
    b. Take you first photo. Next, either advance your focus ring, or move the the camera by hand or using a focusing rail, the desired distance forward.
    c. Keep repeating step b until you have advanced past the furtherest section you want to be sharp.
5. If you are using automatic methods, just press your shutter and wait until the sequences completes. You can watch the viewfinder and stop the sequence if you see that sharp zone goes past your subject.
6. At the end of this sequence take a blank photo to mark the end of the stack before taking your next sequence.

Points to remember:

- It's always better to take too many steps/photos! If in doubt take more!
- Higher f-stop values mean fewer steps are required, or conversely the lower the f-stop value the more steps are required.
- A longer distance between front and back of your subject means more steps.
- A longer focal length lens means less depth of field, therefore more steps.
- The closer you are to your subject, the more steps.
- The higher the magnification, the more steps.

Lighting

- Diffused shade helps avoid dark shadows
- Diffused flash can also avoid dark shadows and, with a large surface area, will also reduce specular highlights.
- Using flash helps reduce movement blur.

Cautions:

- Any camera movement can make alignment quite difficult, though Zerene is able to compensate for this reasonably well.
- Halos can occur where out of focus objects in the foreground partially or completely hide background objects. ***These can also show if you extend you focus bracketing too far in front, or too far behind your subject!***
- Higher magnifications beyond 1:1 require exponentially more care.
- At high magnifications you will almost always have editing to do after you have stacked the images - this is often due to small subject movements and/or optical issues.
- Extreme macro work requires absolute control of all movement - ie no movement of people in the house/room while taking your photo sequence. Everything should be on a concrete floor with heavy duty supports. Be aware that traffic on the roads, people walking arund in the building may cause blur in your stacked images.

My settings using flash: - you will need to experiment!

- 1/100s or more, f5.6-f8, iso 200-1200, flash on 1/16th to 1/32nd power. Diffuser.
- Set 100 shots at a differential of 1 to 2 - I'm usually shooting very small subjects. For flower sized objects I would use a differential of 5-9.
- These setting will vary considerably depending on the power of your flash, magnification, how dark your subject is,the f-stop and ambient lighting etc - you ***will*** need to experiment to find the best settings for your situation.

Interesting/useful websites?

- **https://www.philnortonphotographyblog.co.uk/techniques-3-focus-bracketing**
- **https://www.naturepl.com/blog/2023/01/04/how-to-photograph-the-macro-world-with-robert-thompson/**
- **https://www.zerenesystems.com/cms/stacker/docs/tutorials/tutorialsindex**
- **https://www.heliconsoft.com/helicon-focus-tutorials/**
- **https://support.skylum.com/catalog-tools/focus-stacking**
- **http://extreme-macro.co.uk/**
- **https://fstoppers.com/landscapes/simple-guide-focus-stacking-638132**
- **https://petapixel.com/2019/10/02/beginners-guide-to-focus-stacking-for-macro-photography/ -**
- **https://learnandsupport.getolympus.com/learn-center/photography-tips/macro**
- **https://learnandsupport.getolympus.com/learn-center/photography-tips/macro/photography-with-om-d-mzuiko-60mm-macro**