TRY THIS!

Snowflake Photography

Article and Photographs by Professor Michael Peres

Photographing snowflakes at RIT has become a winter activity that began at the suggestion of alumna Emily Marshall, JPHB '04. Because we have a long winter with lots of snow, it is something that all the Biomed students look forward to. Experience is a good teacher and over time I have developed some basic methods for photographing snowflakes that relies on common equipment and some practical approaches.

Working outside below 32º Fahrenheit

Photographing snowflakes must be accomplished at temperatures that are below freezing and be performed outdoors or in unheated structures. To photograph snowflakes, all equipment must also be kept below freezing, which is necessary to preserve the ice crystal as long as possible. At RIT, we place snowflakes on clean microscope glass slides for ease in handling. Simply holding the glass slide in your bare hand will begin to warm the slide and melt the flake. Pristine snowflakes have a short life cycle and wearing gloves is helpful to postpone the inevitable melting. When at home, I work in my garage and when at RIT, I have found a large area that is isolated from the wind that has a second floor overhang. I have also found in practice that when photographing, the temperature needs to be below 30°F. Acclimating the equipment to the cold will generally take 30 minutes. Isolation from wind and falling snow is also very important. A garden shed or a tent might be a good space to use if it is large enough to accommodate a small table and other related equipment.

Catching and transporting the flakes

The best way to catch and identify good snowflakes for photography is to use a piece of black velvet. I place the velvet in an 8x10 developing tray but truly anything that is stiff will work. Black velvet is ideal because it allows for easy identification of the best flakes but also provides the easy lifting of flakes using a sewing needle taped to a pencil. Velvet allows a needle to pass through fibers without dragging. Using a needle, you carefully pick up the very small delicate ice crystal and transfer it to the 1" x 3" glass slide. Efficiency is important. By the way, do not breathe heavily onto the slide once the snowflake has been transferred because you may accidently blow it away or worse yet melt it.

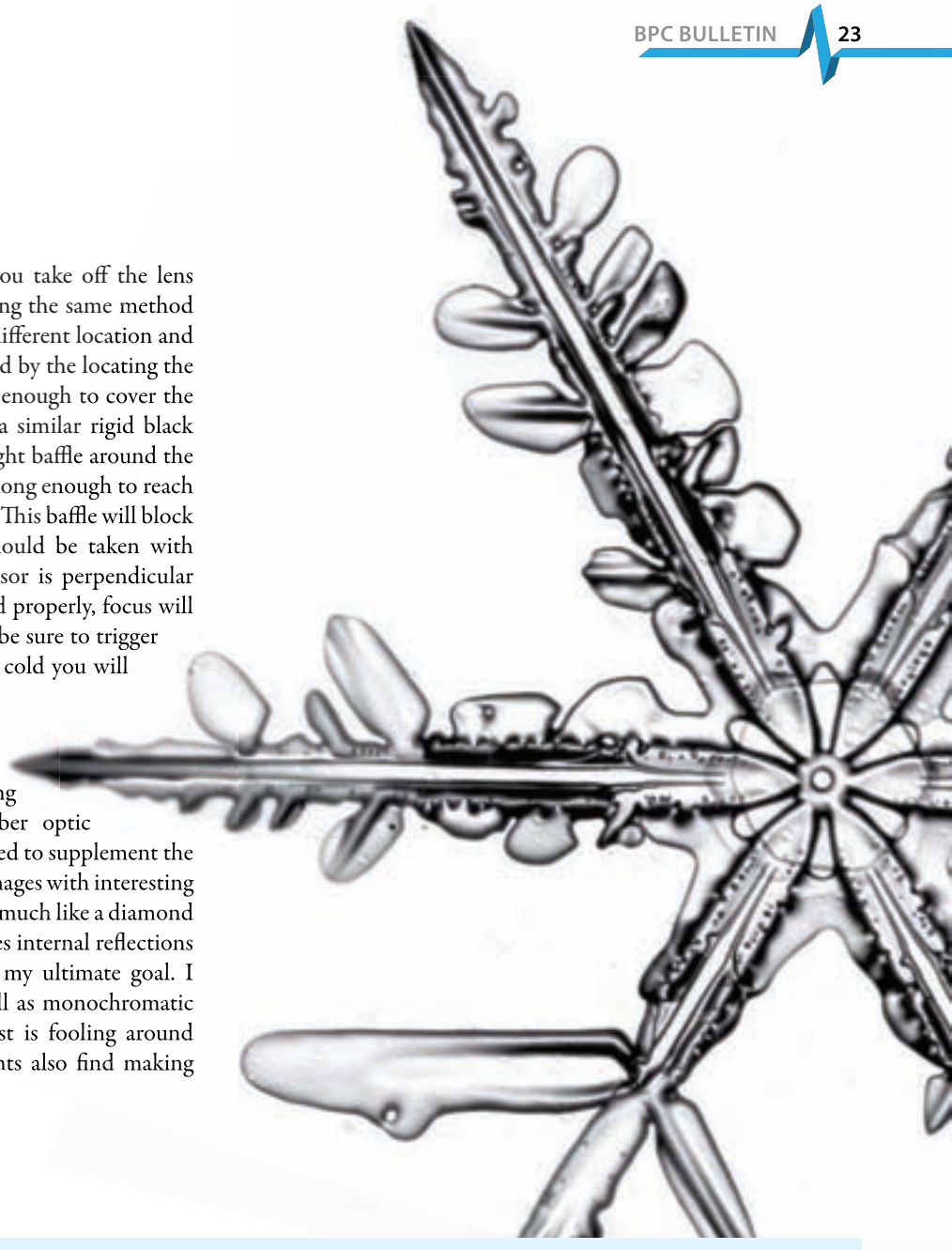
Achieving magnification

Snowflakes come in many sizes and I find that working in the 4-8x magnification range is about right. Achieving this magnification can be accomplished using many types of equipment. A lens that I personally have not used but would like to try is the Canon Macro MP-E 65mm f/2.8 lens. This lens can achieve up to a 5x magnification and couple directly to the Canon camera without any other accessories. Another method to achieve magnification is to use a simple microscope. This would include a medium focal length macro lens attached to a bellows or extension tube. A 60mm macro lens would require approximately 8 inches of bellows (separation) from the sensor to produce this magnification range. A shorter focal lens if owned would create higher magnifications. A stereomicroscope will also work, as will a compound microscope. Most compound microscopes come with illuminators and should be equipped with low magnification objectives such as 2x and 4x when used to photograph snowflakes. Coupled with the secondary magnifier of a microscope, the magnification from this instrument will be (sometimes) too high for photographing entire flakes.

Making a photomicrograph

While there is no easy way to couple a compact digital camera to a microscope, it is possible to make photomicrographs using one. When using a cell phone or compact digital camera, you should place the camera's lens at the photo ocular lens' eye point. When this is accomplished, the camera's lens will relay the image from the microscope effectively to the sensor. I suggest setting the camera to its widest focal length option when using this technique. Hand holding the camera will be very difficult if not impossible and the alignment of camera is very critical. Most of the time, I use a tabletop copy stand and I suspend the camera over the photo eyepiece. If you do not have a vertical stand, you can use a tripod and locate the microscope on the ground.

If you are fortunate enough to be using a photomicroscope, the camera system may already be integrated. If not, and you



are going to use a DSLR camera, I suggest you take off the lens and suspend the camera over the eye point using the same method described above except the camera will be at a different location and without its lens. The distance can be determined by the locating the distance where the microscope's image is large enough to cover the sensor. By using black construction paper or a similar rigid black material, you should create a tube to act as a light baffle around the microscope's photo tube. This baffle should be long enough to reach the camera body but not enter the camera itself. This baffle will block extraneous light from being imaged. Care should be taken with either camera type to ensure the camera's sensor is perpendicular to the optical axis. If the camera is not oriented properly, focus will be lost across the field of view. Before I forget, be sure to trigger the camera using the self-timer. When you are cold you will absolutely introduce shake into the image.

Illumination

Light is a key ingredient for interesting photographs of all types. I often use a fiber optic illuminator for snowflakes. This light may be used to supplement the microscope's built-in illuminator and leads to images with interesting internal reflections. The snowflake's structure is much like a diamond with its many facets. Producing light that creates internal reflections and refracts in the flake's numerous facets is my ultimate goal. I have used color gels, color backgrounds as well as monochromatic strategies. One of the things I enjoy the most is fooling around with the light trying other things. The students also find making interesting light to be great fun.

BPC Contributors

The Biomedical Photographic Communications program appreciates the support of these dedicated individuals and companies, who have generously shared their products and knowledge with Biomed students. Their support has greatly enhanced the Biomedical Photographic Communications learning environment.

This program would not be the same without:

Adobe, Inc.
Amy Friend
Beth Ann Benetz, CRA
BioCommunications Assn, Inc
Canfield Scientific, Inc.
Carl Zeiss Meditec, Inc.
Carl Zeiss MicroImaging, Inc.
Dawn Tower DuBois
Escalon Digital Solutions
Joe Ogrodnick, FBPA
Joe Territo
Keith Mancini
Kristen Frye Orlowski
Megan MacNeil
Rachel Hollar
Ted Kinsman
RIT Printing Applications Lab
Olympus America Corporation
Topcon America Corporation
Xerox Corporation
Jennifer McErney
Chris Irick
Dan DiGregorio
Lindsey Rima
Amanda Moses
William Fischer, CRA
Dr. Jay Packer, MD
Michael Turano
Jim Fosse, RBP, FBCA
Everyone at PAL