SEM Portfolio

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11 December 2014
Part I: Technique Demonstration

1. Critical Point Drying
2. Depth of Field
3. Backscatter
4. Low Voltage Image of an Uncoated Sample
5. High Magnification
6. Stereo Pair
7. Cryofracture
8. Aesthetic
Figure 1: Micrograph of an oyster mushroom gill that was prepared by critical point drying. OA 2, SS 12, WD 10mm, AV 10 kV.
Figure 2: Demonstration of depth of field in SEM. OA 1, SS 16, WD 32 mm, AV 5 kV.
Figure 3: a) Secondary electron micrograph of yarn in SEM. b) Backscatter electron micrograph of (a). OA 2, SS 16, WD 23 mm, AV 5 kV for both images.
Figure 4: Uncoated fingernail in SEM. OA 1, SS 8, WD 33 mm, AV 2 kV.
Figure 5: Toothbrush bristle in SEM. OA 1, SS 8, WD 11 mm, AV 30 kV.
Figure 6: Honey bee head in SEM. OA 2, SS 12, WD 22 mm, AV 10 kV.
Figure 7: Oyster mushroom gill in SEM. Sample was prepared with critical point drying and freeze-fractured using liquid nitrogen. OA 1, SS 14, WD 31 mm, AV 10 kV.
Figure 8: Spore attached to yarn viewed in SEM. OA 1, SS 12, WD 29 mm, AV 12 kV.
Part II: Publication Micrographs

1. Biological Samples

Using Photoshop, I adjusted images of a pollen grain and oyster mushroom gills for gamma, contrast, brightness, and unsharp mask.

I chose to take micrographs of mushroom gills because I have a strong interest in fungal ecology. I like the image of the pollen grain because it’s stuck on an insect, exemplifying the ubiquitous nature of pollen.

The insect was air dried and sputter coated with Au-Pd. The gills were fixed with glutaraldehyde and stained with osmium tetroxide before also being sputter coated with Au-Pd.
Figure 9: Pollen grain on an insect viewed in SEM. OA 2, SS 16, WD 13 mm, AV 12 kV.
Figure 10: Freeze fractured mushroom gill viewed in SEM. OA 1, SS 14, WD 31 mm, AV 10 kV.
Figure 11: Mycelium of an oyster mushroom viewed in SEM. OA 2, SS 12, WD 10 mm, AV 10 kV.
Figure 12: Hymenium of an oyster mushroom viewed in SEM. OA 1, SS 16, WD 32 mm, AV 5 kV.
Part II: Publication Micrographs

2. Non-biological Samples

The following images are of yarn that was sputter coated with Au-Pd. I chose to take micrographs of yarn because of my interest in knitting. On a macro-scale, yarn is so organized and clean. I was curious to see if this changed on the micro-scale. I found that, in some ways, it did change- things got more chaotic. However, in some ways, it remained the same- there are similar patterns of continuity within a single thread as there are in a knit sweater.
Figure 13: Yarn and spore viewed in SEM. OA 1, SS 12, WD 29 mm, AV 12 kV.
Figure 14: Particle attached to yarn viewed in SEM. OA 2, SS 10, WD 23 mm, AV 5 kV.
Figure 15: Cut end of yarn viewed in SEM. OA 2, SS 10, WD 23 mm, AV 5 kV.
Figure 16: Cut ends of yarn viewed in SEM. OA 2, SS 14, WD 23 mm, AV 5 kV.