Background material
4. Additional Sedimentary Structures Handout

Goals
Part A: The objective of this lab exercise is to introduce you to some of the terminology and types of bedforms that are generated in sedimentary rocks by physical, chemical, and biological processes. At the completion of the exercise, you will have a working knowledge of the classes of bedforms and how to describe them and interpret their significance. Realize that the full range of bedforms which occur in nature is much larger than what we will observe in this short lab. The background provided here should be helpful to you as a guide toward future research.
Part B: The second objective of this lab exercise is to show you to some of the varied rock types found in Ohio’s sedimentary layers and elsewhere, and provide an introduction to identifying and describing siliciclastic rock types. You already described the rock samples in week 1. Today we are going to look at three thin sections. This will give you an opportunity to examine some rocks under the petrographic microscope.

Part A: Instructions
Please follow the red numbered sample labels. Work in lab groups of two or three. All lab partners are expected to participate equally in the exercise and write-up. Each person must submit their own typed lab report along with this handout. Please make sure that you list the names of all members of your lab group.

Part 1: Trace fossil hand samples
Describe the trace fossils in each of the six trace fossil hand samples. Use the provided background material to describe and name each of the trace fossils. What information useful for sedimentological interpretation does each trace fossil provide?

Part 2: Sedimentary structure hand samples
Describe the sedimentary structures in each of the six sedimentary structure hand samples. Use the provided background material to describe and name each of the sedimentary structures. What information useful for sedimentological interpretation does each sedimentary structure provide?
Part 3: Bedforms in three dimensions
Using the provided background material, name the bedforms depicted on the following pages. Classifications of the bedding types on both the longitudinal face (A), parallel to the direction of flow, and the transverse face (B), perpendicular to the direction of flow have been filled in for you. Be complete in your identifications and use the terminology discussed in Chapter 4.

Part B: Thin Sections
1. This is a thin section made from a sandstone with both carbonate and quartz cement. Start by looking at the circled portion of the slide with the X10 objective. Look at the slide with the analyzer in (the sand grains will appear to be white, gray and black). What happens when you rotate the microscope stage? Now look at the slide with the analyzer out, the grains should appear clear with lots of impurities in the quartz grains. Do you notice a pattern to these impurities (look at these with the analyzer out)? (hint: they should outline some of the grains? What do you think may have caused these outlines and what do you think they represent? Next hint: the quartz on the outside of the "outlines" caused by impurities is the cement. Make a quick drawing of 5 or 6 grains to show their original shape and their shape after the rock was cemented. Now move the slide around with the analyzer in (grains with be black, white or grey) look for an area with a dirty tan (pink/purple) stuff in-between the grains; this is the carbonate cement.

2. This is a thin section of the Sharon Sandstone from Virginia Kendal Park. Look at the small slide first without the analyzer (grains will appear clear). The light blue color between the grains is blue epoxy that was injected into the rock. Describe the porosity of the rock (and magnification you used)? Does the lack of cement explain why the rock crumbles so easily? Now look at the large thin section, this is also from the Sharon Sandstone. This thin section is too thick and is a little hard to look at. After you have looked at it with the petrographic scope, use the stereo dissecting scope to look at it (with the lighting from the top). What do you think the cement is? The cement in the large slide dissolves quartz as it grows. Look at the small slide and notice the jagged edges on the sand grains. Given this information, do you think that the cement from the large slide may have existed in the rock from the small slide at one time? Why?

5. This is a thin section and hand sample of the Berea Sandstone. Look at the thin section with and without the analyzer in and once again classify and describe the rock (using the handout from week 1). Based on your observations, between the Berea Sandstone and the Sharon Sandstone, from which would you rather build your house? Why?