

## Biological Soil Crusts of JTNP

### Information

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Date/ Time: Saturday, November 23, 9 am – 5 pm  
Sunday, November 24, 9 am – 4 pm

Meet at: [Oasis Visitor Center](#) (click on link for a map of the meeting site)  
74485 National Park Dr., Twentynine Palms, CA 92277

Instructor: Nicole Pietrasiak, Ph.D., Biological Sciences  
Theresa Clarke, M.S., Biological Sciences

### Overview

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The desert floor may look like dirt and sand but it is full of living small and microscopic organisms vital to the park's ecosystem. Many of these organisms live in biological highly active soil crusts that cover the first inch of the desert soil surface. In this field class Nicole Pietrasiak and Theresa Clarke will introduce crypto-biotic soil crusts with an emphasis on soil algae and lichens. Participants will study the secret life of these microscopic organisms as they demystify this thin layer of soil. Nicole and Theresa will discuss the components of crusts such as cyanobacteria (one of the oldest known life forms on earth), green algae, diatoms, bacteria, fungi, and lichens. During the lab session, participants will see the biodiversity of the park's crusts up close through two different types of microscopes. On the second day, the class will go into the field to identify and assess the condition of several types of algal and lichen soil crust communities found in JTNP.

### Itinerary

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Saturday, November 23, 9 am – 5 pm

*Oasis Visitor Center*

- Lecture
- Lunch Break, **bring your own food**
- Lab Session with microscopes

Sunday, November 24, 9 am – 4 pm

*Oasis Visitor Center*

- Field session – exploring the Wonderland of Rocks and Skull Rock
- Snack break, **bring your own food**
- Field session continued – exploring Wonderland of Rocks

### What to Bring to the Course

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#### *Optional Equipment*

- Hiking Poles

***The 10 Essentials: Every day in the Desert***

- Day pack
- 4 quarts of water
- Hiking boots with traction soles
- Lunch and snacks
- Clothing layers
- Hat
- Sun glasses
- Sunscreen
- Notebook and pencil/pen
- Whistle

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### **Fitness Requirements**

Participants must be in good physical condition for courses/activities in a desert that may be hot, dry, windy, and sometimes surprisingly cold.

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### **Hike Level**

Easy to Moderate

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### **Guidelines**

- You are responsible for your safety.
- Park your car in designated areas only. Parking along the side of the road is dangerous to you and the environment.
- Rattlesnakes are present in the park. Avoid contact with wildlife. Put your hands and feet only where you can see.
- Stay with the group. If you get lost, stay put.
- Drink plenty of water. If you run out, notify the instructor or the Desert Institute Representative.
- Before leaving the class, check out with the Desert Institute Representative.

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### **College Credit**

1.0 unit BIOLOGY X412.28 credit through the University of California, Riverside Extension.

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### **Instructor Biography**

**Nicole Pietrasiak** received her Ph.D. in the Soil and Water Program at UC Riverside. Currently she is a post-doctoral fellow at JCU, Ohio. Her research interests include soil science, botany, algal biodiversity, and desert ecology. Ms. Pietrasiak has conducted extensive research on cryptobiotic crusts across the western U.S. and has made major contributions to the study of abundance, distribution, and diversity of crypto-biotic crusts at Joshua Tree National Park. Her current research is on crust community ecology and evolutionary relationships of algae and cyanobacteria found in these communities.

**THERESA CLARK** is a bryophyte ecologist from Maine, but much of her research has been in the American Southwest. She earned a M.S. at Northern Arizona University, studying the taxonomy and ecology of mosses in Grand Canyon National Park, AZ. Currently, she is working on her PhD at the University of Nevada, Las Vegas, under Dr. Lloyd Stark researching the ecophysiology of arid land moss survival in the face of a changing climate. The heart of her dissertation seeks to predict the capacity for desert mosses to “hide” from climate change in protected microhabitats. She is also working on the moss flora of Grand Staircase Escalante National Monument, UT.

### **Suggested Readings**

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Technical reference: <http://www.soilcrust.org/crust.pdf>

Field guide: [http://sbsc.wr.usgs.gov/products/pdfs/Field\\_Guide\\_Book\\_25.pdf](http://sbsc.wr.usgs.gov/products/pdfs/Field_Guide_Book_25.pdf)

Informal reading: <http://geodermatophilia.blogspot.com/>

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\* The Desert Institute staff/instructors will attempt to accommodate participant’s needs; however we reserve the right to deny a student participation in the course due to concerns regarding health and safety issues.

### **Rattlesnake Room Directions**

Coming from the west on Hwy 62, turn right(south) on Utah Trail Rd, drive past the JTNP Oasis Visitor Center and immediately after the brown "Pay Entrance Fee 3 miles ahead" sign turn right into the

south side parking lot. Look for the “Service road Employees only” sign, and park in the dirt lot. The classroom is to the left of the “Resources/Conference Room Building 103” sign.



