

Nature Trails

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Olympic Peninsula. Photo by Marli Miller

Assembling the Northwest: A Roadside View of Oregon and Washington Geology

Marli Miller

**Senior Instructor, Department of Earth Sciences
University of Oregon**

**Friday, 21 September 2018, 7:30pm,
Room100 Willamette Hall, UO Campus**

Several ENHS members will remember that our September speaker, Marli Miller, has been here before. She spoke to us in April 2015. Her book *Roadside Geology of Oregon, 2nd edition*, had just come out and she led us on a geological road trip around our state. Some of what follows has been lifted from what I wrote about her in 2015— shamelessly lifted, given that her early history hasn't changed and I'm plagiarizing my own prose.



Miller grew up in Cincinnati, Ohio. Her interest in photography started while she was a teenager, when a neighborhood friend taught her darkroom techniques. The cover photo shows that she has developed (ahem) quite a talent since then. A sojourn at a summer camp in Colorado led to her infatuation with mountains. And rocks. She went to back to Colorado for her undergraduate education—to Colorado College, in Colorado Springs. She took a geology class in her freshman year, and it didn't turn out well. She got a C+, and began to think maybe history might be more to her liking. During a break while on a road trip she had an epiphany: she was watching water cascade from the top of a road cut and realized the erosion she was watching was geology in action, and she got excited again about the discipline. Even with this renewed interest, geology did not come easily to her, but she finished at Colorado College with a BA in geology, in 1982. The Geology Department there hired her as an assistant in their lab and field classes for the year following her graduation, and it was during this year she discovered she liked to teach. Miller now realizes her initial difficulties with her chosen field have helped her be a better teacher, since she can empathize with those who struggle in her classes.

Following her time in Colorado, Miller took a year off from her formal education. Among her destinations during that year was Death Valley, where Lauren Wright, who had begun working in Death Valley in the late 1940's and was a leading authority on the geology of the region, took her under his wing. The two continued to collaborate over the following decade and co-authored several publications, including the book *Geology of Death Valley National Park: Landforms, Crustal Extension, Geologic History*, now in its third edition.

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After that year of experiential learning Miller went on to graduate school at the University of Washington. Her Master's thesis focused on a fault zone in southern British Columbia, but she remained fascinated with the geology of Death Valley, where she completed her Ph.D. She became especially interested in the Black Mountains, on the eastern edge of Death Valley, and the three turtlebacks in that range – Badwater, Copper Canyon, and Mormon Point. The exposed faults in these places provide a natural textbook for those few who make the effort to visit.

Miller is a structural geologist. Her current research focus has grown out of her early efforts: she wants to reconstruct the structural and kinematic histories of fault zones, and is especially interested in the brittle-to-ductile transition in these zones. Fault zones, besides being fertile ground for geologic research, also provide a rich source of photographic subject matter. If you want to see photos of faults—or anything else geological—go to <http://geologypics.com/> and look through Miller's extensive photo albums. Or look at her blog <https://geologictimepics.com/>, or buy her books!

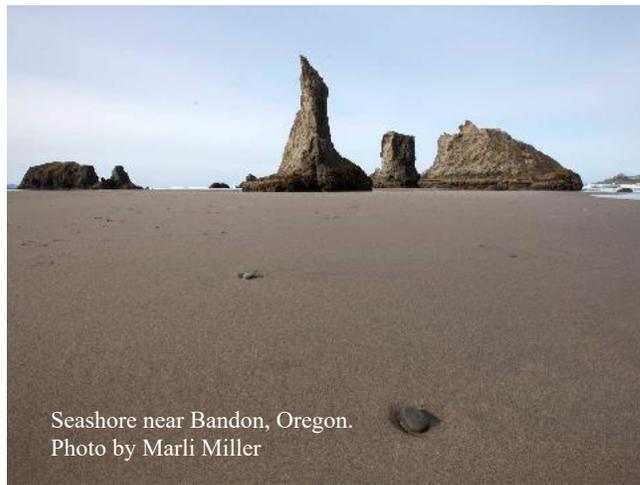
Her experience as a teaching assistant at the University of Washington coupled with the teaching she had done at Colorado College convinced Miller that what she wanted to do with her professional life was to teach geology at the college level. After finishing her Ph.D. she taught for three years at the University of Wisconsin, Eau Claire, following which Miller joined the Department of Geological Sciences (now the Department of Earth Sciences) at the University of Oregon as an adjunct professor. She is now a tenured Senior Instructor.

In 2015, with *Roadside Geology of Oregon* ticked off her to-do list, Miller said she was planning to write the next edition of *Roadside Geology of Washington*. She has now ticked that one off, too, co-authoring it with her University of Washington graduate advisor, Darrel Cowan. In her current book project she is picking out 50 Oregon locations and will describe each site's unique geology with short vignettes and photos. This book's title will be *Oregon Rocks!* Some of the early work she has done on this project might find its way into her talk to us.

This past academic year Miller has been on sabbatical, spending a lot of it travelling. Part of this winter she was in New Zealand, where she helped with a study outing being taken by students from Centre College, in Kentucky. She also went on a field trip to Greece with two other faculty members and about 20 students from the University of Oregon.

In her talk Miller will outline the geology of Oregon and Washington as seen along our federal

and state highways. Beginning with our plate tectonic setting, she will describe the process of continental growth that forms the underlying but diverse “basement” of the region and is readily visible in the Coast Range, North Cascades, Okanogan, Klamath, and Blue Mountains. Following that, a photographic “roadtrip” up I-84 and Washington State Highway 14 in the Columbia Gorge will illustrate many of the younger features that make our landscape so unique. Much of the talk



Seashore near Bandon, Oregon.
Photo by Marli Miller

is grounded in her two books *Roadside Geology of Oregon* and *Roadside Geology of Washington*, as well as some material from the work she has been doing on her current book project, *Oregon Rocks!* Miller’s expertise as a photographer will be on full display. Please join us on Friday, 21 September, at 7:30pm in room 100 Willamette Hall, on the U of O campus to hear “Assembling the Northwest: A Roadside View of Oregon and Washington Geology,” by Marli Miller.

John Carter

Report on Lake Abert Field Trip



Mudcracks on Lake Abert. Photo by Marli Miller

Camaraderie developed early on this trip—whoever suggested hearty appetizers for the evening meal after we arrived deserves a hug and an extra helping of hummus. By the time introductions were over it was clear we had a fine group. Our first day was filled with new revelations: the geologic history behind this part of our state; petroglyphs; ancient grinding stones; scorpions; avocets; sand dunes and their endemic plants. Lake Abert is spectacular, but it’s part of a bigger package; without Abert Rim and the unique geology of the region it couldn’t be the same. Ron Larson, who spoke to us in May about this region, knows everything about the area and shared his nuggets in a low-key, humorous way. On day two we drove from our base at Hunter Hot Springs Resort through Paisley to Paisley Caves, from which came the now-famous coprolites that have turned back the time of earliest habitation of North America. Tom Titus told us about lizards and snakes and how to catch them without hurting them or us and turned us loose. Five lizard species later (it was too warm for

snakes) we scrambled from the valley floor to the Caves and again listened to Tom tell us what he knows about the digs, their results, and what he’s doing with a couple of very old lizard fossils. What follows are comments by some of my fellow trippers about their impressions, and a few photos.

John Carter

Before the trip, I felt privileged to be on my way to the Paisley Caves, where I hoped to stand where other women had lived 14,500 years ago, looking toward Summer Lake, their view of the world. However, when we were there on Sunday, Tom said that the archeological evidence suggests that the caves were temporary lodging for hunting parties, probably of young men—not long-term dwellings. Where did the young men come from? Not far—



Western Fence Lizard.
Photo by M Allardt

perhaps where you were yesterday. Oh! Ron Larson had taken us on Saturday to village sites on the eastern shore of Lake Abert. There we saw grinding stones, petroglyphs, and pictographs. Their carbon-dating evidence

only goes back 3000 years, but there may have been

older settlements in those sheltered places.

Margaret Essenberg

This was my second year in a row to be fortunate enough to go into eastern Oregon with the ENHS, only two years in to having moved to Eugene. The sunshine, wide-open spaces of the Basin and Range region, the two days, each with a unified theme, the enchanting setting of the lodge beside the Perpetual



Abert Rim. Photo by Saelon Rendes.

Geysers, the scintillating conversations as we relaxed, made for a magical, carefree mood. The high point of my Abert Rim day was seeing seven white pelicans appear as we sighted a golden eagle soaring, and seeing the sun back-light their wings as they corkscrewed upward to catch thermals for their long day's travel. Seeing the graceful and beautiful avocets at the lodge, observing how the willet, while wading, was a drab brown but in flight, the undersides of the wings showed dramatic black and white contrasts was thrilling, as was learning the willet's cry: WILL WILLET! WILL WILLET!

Observing the diverse interests of the participants was amusing, too. I had never met a lichenologist like Steve, who pointed out the neon green on the high

cliffs of Abert Rim; many folks needed to exactly identify certain flowers; Tom Titus taught noose hunting of lizards—and I got to hold a feisty Western Fence Lizard with its bumpy scaly back and cobalt blue undermarkings and pose it for photographers.

I enjoyed sharing the experiences with Sheila Mahan, my friend from Portland, who has felt encouraged to try more challenging hikes by her ability to make it up the rocky slope to the Paisley Caves.

I loved soaking in the magnesium- and lithium-rich mineral waters of the Hunter's Lodge pool—very warm and relaxing—while looking up at the pure blue sky. **Joanna Alexander**

What did I like best? Was it standing next to Abert lake at the bottom of the Abert rim uplift, appreciating the awesomeness of basin/range geology; or was it learning about the paleo lakes, both how extensive they were and how humans lived around them; or was it learning about three major groupings of lichens (Finally a way for me to interact with lichen besides just enjoying their beauty); or was it learning about the interaction of algae, cyanobacteria and the calcium in water that produces tufa, a white coating on many rocks and then later going to see large tufa rock formations; or was it participating in lizard catching and having a herpetologist talk about lizard temperature and surface orientation preferences; or was it learning about how the Paisley caves were excavated and what materials were found and their ages, and about rock points that conflict with earlier assumptions about Clovis points? Wonderful information in such a wonderful place. So much of what was special was sharing a beautiful space with people who love the natural world and have learned so much about it and are willing to share that knowledge.

Mary Allardt

Wondrous Journeys by Reida Kimmel

Since childhood I have loved hearing the cries of Gulls, watching Terns fly, and seeing Sanderlings and Plovers racing to catch morsels left by retreating waves. I thought I knew seabirds, but what I knew were shore birds. Seabirds are lonely foragers of the open ocean, returning to land only for breeding. Land-bound, we humans might see a few individuals if we happen to be at sea. We will be awestruck by the seabirds' grace, power, and ability to thrive in the gales. The open ocean is their true home, but if we can visit a breeding colony we will learn much, hearing, seeing, yes, smelling them, as we gaze down from cliffs or sail around colonies at the base of

cliffs. I was in my fifties before I saw my first seabird



Puffins. Photo by R. Kimmel

colony, on Sumburgh Head, Shetland. I was enchanted. The spell never wore off, but instead became a compulsion to return again and again.

I looked down from a great height, at a breeding colony divided like a cake into layers. At the top, just feet away, the charming Puffins went about their business, into and out of their burrows, taking a twirl of a flight off over the sea and coming back to stretch wings, bow and preen, assuring all present that he/she was no threat. Below the Puffin burrows, on the highest rock ledges were Fulmars, tiny relatives of albatrosses, and their adorable fluffball chicks. Stay away! If disturbed, Fulmars will spray you with the oily rancid mixture of partly digested fish, which they regurgitate for their chicks, and your clothes will stink forever.

Next down, and rather hidden, were Kittiwake nests. These small gulls hide for protection from Skuas, Gannets and Great Black-backed Gulls. Also, approximately at that level, were the solitary nests of Black Guillemots, their red feet and white wing bars announcing breeding season. Present but hard to see, were Razorbills, the closest living relatives of the extinct Great Auk. Puffins, Black Guillemots, common Guillemots and Razorbills, are all *Alcidae*. They swim underwater with their wings and can achieve great depths when foraging.

Numerous, vociferous and sociable, the common Guillemots formed the next layer of birds, clustering by families as close as possible, each pair protecting its egg, not from neighbors but from a lethal slip off the precipitous bare rocks on which they 'nested'. Close to the water's edge were the Cormorants, two species, Shag and Cormorant, virtual lookalikes except for different patterns of color and feathering. In the waters, cruising for prey, were Great Skuas and Great Black-backed Gulls. When they flew, the other birds cried out and huddled. Although they have separate breeding colonies, the Gannets, fierce and warlike except toward their mate and chick, were always in evidence, circling the headland, flying in groups or alone, occasionally diving, like arrows shot into the sea.

There is so much to learn, sometimes sad or horrible but for the most part utterly amazing. From early times poets spoke of the desolation of the sea, the lonely cries of the seabirds, of their beauty or of their connection to things diabolical. The seabirds were so mysterious. They arrived in spring bringing bounties of eggs and rich oily flesh to sustain the coastal peoples. Killing was not just for food in greasy abundance, but in later years, for sport, shooting thousands of hapless breeding birds for no purpose at all, except to dine on a few or to sell the wings and feathers to decorate ladies' hats. Then the

chicks fledged, and the birds just disappeared. But even if sportsmen and peasants could have seen the seabirds out in the ocean they might not have recognized them.

As soon as they are feathered, pufflings jump into the sea, little grey birds alone on the ocean, without parental care or guidance. Their parents remain on shore for a while, starting to shed their iconic breeding plumage and becoming little grey birds too. Guillemots leave the breeding cliffs as soon as their chicks, "jumpers", leap off the ledges and into the sea. The fathers tend their fledged young for months, feeding and escorting them until they can fly and forage alone. Young gannets must find their way



Gannet colony. Photo by R. Kimmel.

utterly unintended. They hang out at the edges of the colonies before taking off

independently to explore the North Atlantic.

All the seabirds, from huge Albatrosses in the Pacific to tiny Shearwaters and Puffins, share behavioral characteristics important for survival. None of them breed early, gaining years of experience, learning where and how to fish most effectively. They are monogamous, choosing a mate that can be relied on to share the duties of tending that single egg. The investment is in quality parenting. Puffins will die of starvation flying so far and fishing so hard to provide for a puffling. When there truly is not enough food for parents and chick, adults will abandon their chick, hoping for better breeding years during the course of their long lives.

With global ocean warming, the abundant sand eels (sand lances) have moved away from the coasts of America and Europe to colder waters, leaving the alcids with other less protein- and fat-rich species to feed their young. Nesting failure has greatly reduced the size of breeding colonies, most notably in Iceland's Westmann Islands, once home to the world's largest puffin colony. Commercial fishing, a huge problem several decades ago, is now controlled, but if the waters are too warm, the sand eels will not come back. Gannets and fulmars, however, are expanding their range and populations in the North Atlantic. Being divers, they forage close to the

water's surface, where booming populations of mackerel and herring feed them well.

Much of the mystery of seabirds' lives away from their breeding colonies is now resolved, thanks to radio tracking. The knowledge is as wondrous as the birds themselves. Wearing tiny GPS devices, each individual bird tells researchers its latitude and longitude twice daily, thus tracking its movements over the year. Kittiwakes tracked from Middleton Island, Alaska, forage close by to provide food for chicks, and then take occasional long journeys to obtain calories for themselves. Each gannet colony has a distinct fishing territory, fanning out from the breeding site. Tracking over a period of years shows

that each Puffin follows its own unique path around the North Atlantic, the same path year after year! Shearwaters are famous for their ability to find their burrows. Now we know that they use the winds to travel annually from Africa and Europe to Brazil, then Patagonia, then along the east coast of America and back to Europe and Africa. The Shearwaters spend all their lives exploring the world's oceans. Long before they breed, they know where to go to feed and how to get home.

Adam Nicolson's *The Seabird's Cry: The Lives and Loves of Puffins, Gannets and Other Ocean Voyagers* is a book of beauty, erudition and passion. It was my chief source. Highest recommendations!

Events of Interest in the Community

McKenzie River Trust

Saturday, 15 September, 10am-1pm. Tree Care at Berggren Watershed Conservation Area. Go to <http://www.mckenzieriver.org/events/list/tree-care-at-berggren-watershed-conservation-area/> for a description of this event and a map.

Tuesday, 25 September, 5-11pm. McMenamins Friends and Family Night. Eat and drink with a clear conscience: 50% of the proceeds of this soiree at McMenamins North Bank will go to the MRT.

Saturday, 29 September, 9am-4pm. Salmon Celebration. The Salmon Stewards of Lane County, McKenzie Watershed Council, and McKenzie River Trust celebrate the return of the salmon to our Northwest rivers at the annual Salmon Celebration. This salmon-focused event featured hands-on education, art, and entertainment for all ages. McKenzie Track, Blue River, Oregon. Go to <http://www.mckenzieriver.org/events/list/salmon-celebration/> for a map.

For other MRT events—of which there are many—go to <http://www.mckenzieriver.org/events/>

Lane County Audubon Society

Saturday, 15 September. Third Saturday Bird Walk. Go to <http://www.laneaudubon.org/> for location and times.

Tuesday, 25 September, 7:30pm. Paul Engelmeyer, Audubon Tenmile Creek Sanctuary Manager, will talk about **Land and Sea Conservation Issues and Strategies.** These include Oregon marine reserves and the conservation challenges, along with forage-fish and Coho recovery efforts on the Oregon coast, and issues facing the Marbled Murrelet. Eugene Garden Club, 1645 High St.

Mt. Pisgah Arboretum

Saturday, 15 September, 10am-12pm. Late Summer Wildflowers Walk. Join Arboretum Interpretation Coordinator August Jackson for a tour of the amazing diversity of wildflowers that wait to bloom until the end of summer. We'll take a walk along a wet prairie and down to the river to see emergent vegetation in bloom. We will also look at which insects pollinate these late-season flowers. Meet at the Visitor Center. Don't forget your parking pass. \$5, members free.

Saturday, 22 September, 10am-4pm. Landscapes en Plein Air: Painting Nature From Life in Oil. In this six-hour workshop with Jordan K. Walker we will explore the basic principles of landscape painting, including composition, value, depth, and color. We will paint directly from life and learn to record some of the subtleties of nature while altering what we see to create compelling images. We will also touch on some essential techniques of oil painting. All levels of experience are welcome! Don't forget your parking pass. Members \$30, non-members \$40. Pre-registration required. To register and view a full materials list visit <http://www.mountpisgaharboretum.com/workshop-registration>

Saturday, 13 October, 10am-4pm. Oaks for the Land, Acorns for the People: Ecology and Sustenance of a Wild Local Food. In this workshop with Heron Brae, instructor at the Columbine School of Botanical Studies, we will explore the role of oaks in the world, the botany and identification of oaks, and also how taking care of the oaks can help meet human needs. You will learn how to access acorns as a traditional food. Meet at the Visitor Center. Bring a lunch, bowl and utensils, pad and pen, and mortar and pestle (optional). Members \$50, non-members \$60. Don't forget your parking pass. Pre-registration required. To register call 541-747-3817 or go to: <http://www.mountpisgaharboretum.com/workshop-registration>

Sunday, 14 October, 8-11am. Bird Walk. Join Julia Siporin and Joni Dawning for another monthly bird walk intended for people with all levels of birding experience. Come discover the Arboretum's avian diversity. Please bring binoculars. Option to continue the walk until noon for those who are interested. Rain or shine. Meet at the Arboretum Visitor Center. Don't forget your parking pass. \$5, members free.

Friends of Buford Park and Mt. Pisgah

Monday Morning Regulars, 9am-12pm. Contact volunteer@bufordpark.org for more information.

Tuesdays and Thursdays, 9am-12pm. Nursery Work. Meet and work at the Native Plant Nursery at Buford Park. Enter Buford Park from Seavey Loop Road. Turn LEFT after crossing the bridge and drive 1/4 mile to the nursery.

WREN (Willamette Resources and Educational Network)

Go to <http://wewwild.blogspot.com/> for information on WREN upcoming events.

The University of Oregon’s Museum of Natural and Cultural History

New Exhibit: NAVIGATING KNOWLEDGE. From monkeys and maps to fossils and folklore, MNCH collections help University of Oregon scholars solve mysteries about our planet and our collective human experience. Glimpse into the vaults with UO faculty and student researchers and join their ongoing investigations: you’ll traverse land and sea to uncover life’s origins, voyage across the Pacific in search of the First Americans, discover how fossils can predict earthquakes, explore arts in Africa and the Americas, and more. Other exhibits: OREGON – WHERE PAST IS PRESENT; EXPLORE OREGON; and H2O TODAY. Exhibit hours: Tuesdays – Sundays 11am-5pm.

Native Plant Society of Oregon, Emerald Chapter

Visit the [Emerald Chapter Web site](#) to learn more about the latest chapter events, plant lists and botanical information about Lane County plants and the people who love them.

Nearby Nature

Thursday 20 September, 9am-12pm. Day of Caring at Alton Baker Park. Join Nearby Nature and other community members in improving overgrown garden beds in West Alton Baker Park as part of this year's Day of Caring. Help beautify this space, and maybe see a Great Blue Heron, Osprey, or other waterfowl. Gloves, tools, and snacks provided. Bring a water bottle and dress for the weather. Please wear long sleeves and pants, and closed-toed footwear for safety. Please [register for the event on United Way's Day of Caring page.](#)

Saturday, 29 September, 9am-12pm. Alton Baker Park Cleanup (Co-Sponsored by SOLVE). Join volunteers with SOLVE and Nearby Nature for a clean-up of West Alton Baker Park and the Whilamut Natural Area. This event will focus on the riparian and upland areas found in the park, keeping trash out of waterways, protecting the creatures that live here, and enhancing natural beauty. Nearby Nature will provide tools and snacks. Please dress for the weather, bring your own water bottle, and wear something you don't mind getting dirty. Long pants and closed-toed shoes are recommended. Given potential safety hazards, volunteers should be aged 10 years and older. Please register on SOLVE's website at <https://www.solveoregon.org/opportunity/a0C1I00000FEYMx>

North American Butterfly Association, Oregon (Eugene/Springfield) Chapter

Monday, 8 October, 7pm. Weedy Field or Wildlife Habitat? Naturalist Rick Ahrens conducted an insect survey in ten-acre Razor Park this spring and summer. Join him for a look at the identity and ecology of many of the common insects that live in our area. Eugene Garden Club, 1645 High St.

Proposed Douglas-fir National Monument.

Sunday, 7 October. All day Photo Tour of the Proposed Douglas-fir National Monument. See fall color on this guided tour of this impressive area. Little or no hiking. To register, or for more information, email Dave Stone at dns@efn.org. Put "Autotour" in the subject line.

ENHS welcomes new members! To join, fill out the form below. Membership payments allow us to give modest honoraria to our speakers, as well as to pay for the publication and mailing of *Nature Trails*. Our web address: <http://biology.uoregon.edu/enhs>

MEMBERSHIP FORM

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ANNUAL DUES: Family \$25.00
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Annual dues for renewing members are payable in September. Memberships run from September to September. Generosity is encouraged and appreciated.



Columbia Gorge. Photo by Marli Miller.

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2018-2019 Speakers and titles or topics

21 Sept.	Marli Miller	Assembling the Northwest: A Roadside View of Oregon and Washington Geology
19 Oct.	Michael Nelson	Wolves and Moose on Isle Royale
16 Nov.	Scott Fisher	Gaining a Cosmic Perspective: An Astronomical Look at our Place in the Universe
14 Dec.	Bruce Newhouse	Pollinator Primer: Your Tiny Neighbors and the Plants They Love
18 Jan.	Laura Tesler	Undersea Photography
15 Feb.	Samantha Hopkins	Evolving Mammals on an Active Landscape: Biogeographic History of Oregon's Mammals Over Deep Time
15 Mar.	Amanda Stamper	Burning for Butterflies, Birds, and Blooms: Prescribed Fire in the Willamette Valley
17 Apr.	Scott Burns	Cataclysms on the Columbia: The Great Missoula Floods
17 May	Vanessa Petro	How Busy are Beavers in Oregon?