National Association of Geoscience Teachers

Pacific Northwest Section

Spring 2022

Greetings from the President

Derek Turner,
Section President,
Douglas College

I hope you are all having an excellent spring! This time of year always feels to me like a season of change, not just with the weather, but with the end of our academic year and with starting to look forward to field work. This year, I've been waiting for the last of the snow to melt before heading back to Yukon Territory to do some surficial geology mapping. I'm sure many of you are also looking forward to getting back to the field, whether for research or teaching purposes. I'll be leading a full-sized field school for the first time in three years, exploring the geologic history of southwest British Columbia, with locations in and around Vancouver, BC.

We also have the return to our annual meeting in Pendleton, Oregon June 20-22. This should be a great event, with plenty of opportunities to catch-up with colleagues and make new connections. I'm also excited to see some of the spectacular geology in a part of the state that I haven't had the chance to explore for a few years. If you have any questions about the conference, registration or submitting an abstract for a talk or poster, please contact Philip or myself. See you in Pendleton!

Finally, a **BIG WELCOME** to **Joel Cubley**, our first-ever councilor and representative for **The Yukon!** Feel free to drop Joel an email to say hello and we all hope to see him this June.

Derek.

2022 NAGT Pacific Northwest Section Conference!

Blue Mountain Community College, Pendleton Oregon (contact Philip Schmitz, pschmitz@bluecc.edu)
June 20-22

Monday, June 20th – Meeting Day. Meetings and Presentations will be held in person at **Blue Mountain Community College** but will also be made available for remote viewing using ZOOM.

Tuesday, June 21st - Field Trip - **Tower Mountain Caldera Complex.** The field trip will head south of Pendleton over the Blue Mountain anticline to the Tower Mountain volcano complex. The caldera forming eruption 32 Ma, produced ring fractures from which domes of rhyolite and dacite emerged which can be viewed from the road. After lunch, the trip will stop at andesite and rhyolite flows associated with Tower Mountain, and as we return back to Pendleton, we will stop at Permian Elkhorn Ridge Argillite.

Wednesday, June 22nd – Morning Field trip – **Columbia River Basalts.** The field trip will head west where the Umatilla River canyon cuts through the Reith Anticline, exposing the Grande Ronde and Wanapum Basalt.

Afternoon Field Trip – **Mountain Home Metamorphic Complex**. The Mountain Home Metamorphic Complex consists of variably metamorphosed Mesozoic and Paleozoic igneous and sedimentary rocks that are exposed in areas along the crest of the Blue Mountain anticline. Road damage from flooding in 2020 has restricted access to outcrops in this area, so the field trip will be limited.

Elkhorn Ridge argillite (Tuesday field trip).

Sand Hollow Member of Frenchman Spring Basalt (Wednesday a.m. field trip).

CALL FOR PAPERS! - Monday June 20, 2022 - Conference Day, Science and Tech Building, Blue Mountain Community College.

Abstract Deadline - May 23, 2022. If you would like to present a talk (15-20 minutes) or poster (teaching techniques, geology research, undergraduate research, etc.) submit your abstract to Philip Schmitz at pschmitz@bluecc.edu. Please include "**NAGT Conference Abstract**" in the subject heading of your email. Make sure that your abstract includes:

● Whether an oral presentation or poster is being submitted
● Title
● Author(s) name, affiliation, and contact email addresses
● Abstract length: maximum 1 full page (8.5" x 11") in Times New Roman, 12-point font. You may include legible line diagrams, graphs or tables. Must maintain at least 1.0" margin on all four sides.
● Deadline — May 23, 2022, Due to the limited amount of time during conference day, acceptance for oral presentation will be based on first submitted, first granted basis. If time slots for oral presentations fill before the deadline date, you'll be contacted in regards to a poster option.

CWU Students Create Interactive Map to Discovery Rock Garden

by Lisa Ely
Central Washington University

Graduate students in the Central Washington University (CWU) Geological Sciences Master's program created an online interpretive map for visitors to the CWU Discovery Hall Outdoor Rock Garden (https://www.geology.cwu.edu/discovery-rockgarden/). The **Discovery Rock Garden** forms an outdoor classroom for geology students and a learning experience for visitors to the CWU campus. The Rock Garden contains rock types from around the Pacific Northwest, including Columbia River basalt, Chelan migmatite, Ginkgo petrified wood, and many more that excite local geology enthusiasts.

Every year, the new cohort of Geology graduate students takes on a public outreach project. The switch to online learning in 2020 was the perfect opportunity to launch a virtual rock garden tour that can be enjoyed by anyone anywhere. Each student adopted a boulder from the Discovery Rock Garden and wrote a description of the rock type, how it formed, where it came from, how old it is, and what it is used for. One of the students, Lindsay Henning, created the online map of the grounds and marked the boulder descriptions with a rock hammer icon.

Open the map, tap on a hammer and start exploring! www.geology.cwu.edu/discovery-rockgarden. Better yet, visit the Discovery

Rock Garden in person. Exterior signs in the garden have a QR code to link to the interpretive map right on your phone while you stroll the grounds.

Congratulations Ron!

After 26 years as the lead geology instructor at Southwestern Oregon Community College, our good pal Ron Metzger is calling it a career! **Congratulations Ron and a happy, super well-deserved retirement to you!** As some of you know, Ron was the PNW Section President from 2011-2014, and he organized and hosted **two** section conferences (2005, 2013) at SWOCC in beautiful Coos Bay, Oregon. Ron is known throughout the Coos Bay community not only for his community service, but also for the fantastic annual geology lecture series he has produced, and for his absolute dedication to getting students out into the field on his many field trips. Thank you, Ron, for all your contributions to NAGT and to your devotion to Earth Science education!

The "silver lining" to Ron's retirement is that he leaves behind an awesome geology program (a legacy of his great career) housed in a brand-new facility, of which SWOCC is presently looking to fill with a new hire! If your interested in applying for this position, in a spectacular geological location, go to:

https://www.schooljobs.com/careers/socc/jobs/3483177/geology-instructor-tenure-track-faculty?page=2&pagetype=jobOpportunitiesJobs

The next and possibly last SWOCC public geology lecture under Ron's leadership will be "***The Last Lecture? Oribatid Mites, Conodonts and Musings From Nearly Four Decades in the College Classroom***" by the master himself on Saturday, May 21, 2022 at 7:00 pm. You can experience this via Livestream at: Geology Lecture Series 2021-22 on Livestream

2022 Tobacco Root Geological Society Summer Field Conference

The TRGS will hold its 47th Annual Field Conference July 29 – 31, 2022 in **Wenatchee, Washington**. The call for papers has just been issued. More conference information will be available in late spring. The conference organizer is **Kelsay Stanton** (kelsaystanton@gmail.com).

For more info, go to:
https://www.trgs.org/2022-field-conference-wenatchee

Eocene-age volcanic rocks make-up Saddle Rock outside Wenatchee, WA. (Photo by Ben Stanton)

Tree Rings and Landslides

by Pat Pringle

We just presented at the Northwest Scientific Association Annual Meeting (via Zoom) in March:

Davi Nicole; Patrick Pringle, Francesco Fiondella, Jeff Lockwood, and Rose Oelkers, 2022, **Online labs to introduce undergraduate students to scientific practices in tree-ring research**: Journal of Geological Education, Vol. 70, No. 1 [link: DOI: 10.1080/10899995.2021.1927567]

Pringle, Patrick T.; Black, Bryan; Vallance, James W., 2022, **Tree-ring dating of the Electron Mudflow, a large, clay-rich lahar from Mount Rainier, to late 1507 CE**

[Abstract]: Northwest Scientific Association, Annual Meeting, 92nd, [in press].

Our paper on radiocarbon dating of the Bonneville landslide is in press in *Quaternary Research*:

Reynolds, Nathaniel D.; O'Connor, Jim E.; Pringle, Patrick T.; Bourdeau, Alex; Schuster, Robert L.; 2022, **Age of the late Holocene Bonneville landslide and submerged forest of the Columbia River Gorge, Oregon and Washington, USA, by radiocarbon dating**: Quaternary Research 1–18. https://doi.org/10.1017/qua.2022.7

It's open access, although has not been put online as of yet...should be soon!

Lidar in Washington State

by Abby Gleason
Washington Geological Survey

For those working and studying in the geosciences, lidar (light detection and ranging) data has transformed how geology is captured by remote sensing. Lidar data is most known for the ability to 'see through the trees', capturing elevation data through the dense Washington forests and delivering unparalleled views of the hidden landscape underneath. The accuracy and resolution of lidar data also brings out subtle variations in elevation across the eastern plains, revealing rich geologic history.

The Lidar Program at the Washington Geological Survey, housed at the Department of Natural Resources, began in 2016. The devastating landslide along State Route 530 two years previous prompted the state to take a close look at hazard mitigation and how lidar plays a key role in mapping the bare earth surface and features of geologic hazards. Funding for the Lidar Program was granted in the 2015 legislative session, with emphasis on collecting new lidar, updating deficient lidar, and making the data available for public use. The Lidar Program has since expanded collection to focus on high-quality coverage across the state, recognizing that the diverse range of applications supported by lidar can benefit the state in multiple ways.

For geologic applications, lidar is used for everything from mapping, hazard identification, modeling, monitoring, and change detection. One of the original program goals was mapping landslide hazards, and lidar does a stunning job of revealing landslide features. The example below is the Van Zandt landslide, more commonly known as the 'Devil's slide', in Whatcom County (figures 1 and 2). Completely covered in vegetation otherwise, the lidar data exposes a multiple-event history for the slide area with impressive detail of the landslide runout and terrain.

Figure 1: Aerial photo of the Van Zandt area in Whatcom County. Completely vegetated, it is difficult to see the landslide features.

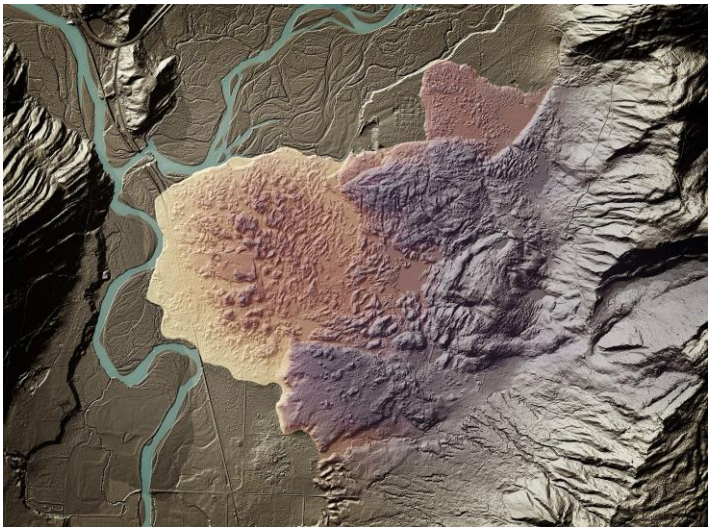


Figure 2: 'Bare earth' or 'last return' lidar returns information from the ground surface, revealing the complex landslide structures in the Van Zandt area. Image credit, Dan Coe, Washington Geological Survey.

The Washington Geological Survey is also using lidar data to model tsunami inundation along the coast and Puget Sound. The higher resolution lidar data can provide more insight on where flooding will occur and the level of impact (figure 3). In turn, this helps local emergency management plan evacuation routes and response.

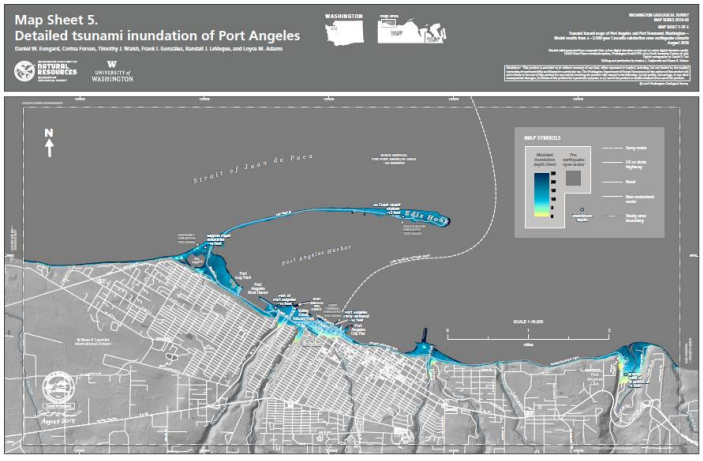


Figure 3: Tsunami inundation map of Port Angeles, produced by the Washington Geological Survey. Lidar data was used to model the onshore inundation level.

Lidar data has many more geologic applications. For a look at how lidar specifically informs the geologic sciences, visit 'The Bare Earth' story map developed by the Washington Geological Survey (https://wadnr.maps.arcgis.com/apps/Cascade/index.html?appid=36b4887370d141fcbb35392f996c82d9)

Once collected, the lidar collections can be accessed through the Washington Lidar Portal (https://lidarportal.dnr.wa.gov). As a user zooms in and out, the Table of Contents (TOC) on the left updates with the available projects in the viewing window. Those projects can also be turned 'on' and 'off' in the TOC to view each project individually and to orient the basemap to the area of interest.

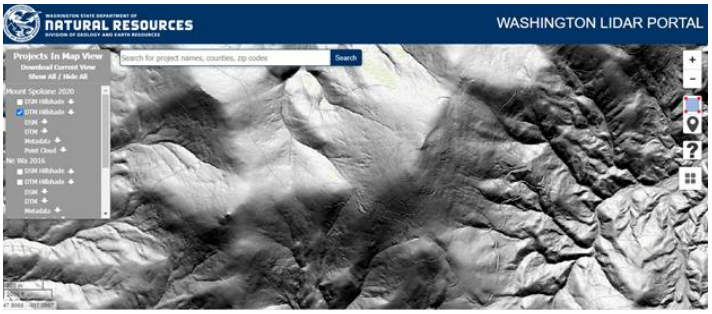


Figure 4: The Washington Lidar Portal, zoomed into a view of Mount Spokane.

Once the user finds the area they want to download, they can use the area of interest tool on the right side of the screen to create a rectangular selection area or choose a single tile. The download menu pops up, where the user can choose which products they wish to download from each available project and see an estimate of the download size.

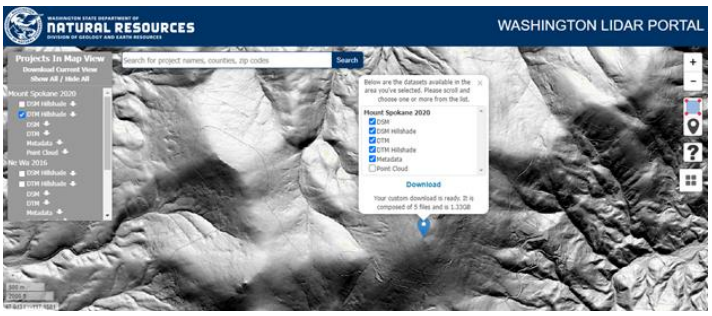


Figure 5: Download menu on the Washington Lidar Portal. Users can choose which lidar projects and products they wish to download.

Stay tuned for updates to the **Washington Lidar Portal** as new tools and features are added, along with more lidar collections!

For questions about the Lidar Program or lidar in general, feel free to contact Abby Gleason, the Lidar Manager at the Washington Geological Survey (Abigail.Gleason@dnr.wa.gov).

News From Alaska

by Sonia Nagorski
University of Alaska, Juneau

Spotlight on Sitka, Alaska!

The Sitka Sound Science Center plays many roles in providing geoscience and ecology education and research in southeast Alaska. The Center is at once an aquarium open to the public, a hub of hands-on marine science education programs and camps for schoolkids, the organizer of the annual Whale Fest each fall, and a center where resident and visiting scientists work on a variety of research projects. For example, next week they are hosting a field course for 40 high school students from California coming to study forestry, earth and marine science, and sustainability in the region.

This summer they are rolling out a landslide risk dashboard in the form of a web app, which will allow the community to view landslide risk level based on geoscience models and to take recommended actions. Landslides are one of the many large natural hazards in Sitka, which is highly vulnerable to tsunami, volcanism, and landslides due to its coastal location on the edge of the North American plate, and its steep mountains and prodigious rainfall. The web app will be launching by August and is the culmination of a 5 year NSF funded research grant that followed deadly slides in 2015 (check the SSSC webpage in August). This innovative model for landslide risk is based largely on rainfall intensity measurements and predictions from the NWS. The Landslide Research Team involves SSSC, Sitka Tribe of AK, Division of Geologic and Geophysical Surveys, USGS, NOAA, NWS, USFS, Rand Corporation, University of Oregon, OSU, USC, and others.)

SSSC's next big hazard-related project is expanding natural hazard monitoring and warning systems in Sitka and 6 other communities in SE Alaska. (https://sitkascience.org/project-kuti-expanding-natural-hazard-monitoring-and-warning-systems-in-se-alaskan-tribal-communities/). This new project (called KUTÍ (the Tlingit word for weather)) will be working to develop a regional warning system for flooding, avalanches, and landslides.

Jacyn Schmidt, Geoscience Coordinator at the SSSC, and Rob Lempert of Rand Corp and PI of the project, look onto a 'tipping bucket' rain gauge communication box on Harbor Mountain above Sitka, Alaska. The rain gauge is part of a 10-instrument network measuring hourly rainfall to study microclimates in Sitka.

Jacyn Schmidt adjusting the rain gauge on a hydrologic monitoring system that also includes monitors soil moisture using soil conductivity and pressure within a well.

As if Sitka didn't have enough going on, its neighborhood volcano Mt. Edgecombe, stirred with seismic activity for much of mid-April. This small stratovolcano that sits close to the Queen Charlotte transform fault unleashed a swarm of small earthquakes (M<3) that the Alaska Volcano Observatory is attributing to magmatic movement at approximately 5 km depth, rather than tectonic shifts. SSSC is planning to support AVO's recent efforts to install instrumentation (currently lacking) on Edgecombe, which is located only 24 km from the city center.

Check out their social media sites (@sitkascience on Instagram) for updates on SSSC's coming events—there's lots of great information there for students and educators alike.

News From Washington

by Andy Buddington
Spokane Community College

The ***Washington Science Teachers Association*** (WSTA) 2022 annual conference will be in Wenatchee (WA) October 14 & 15th (2022): https://wsta.wildapricot.org/

The ***Washington Geologic Survey*** has recently posted new geologic mapping data to their Geologic Information Portal. The new mapping includes the 1:25,000 & 1:99,000 scale surface geology dataset. For more info, go to:

https://washingtonstategeology.wordpress.com/category/washington-state-geology-news-posts/

To view the portal, go to: https://geologyportal.dnr.wa.gov/2d-view#wigm?-13861016,-13078301,5741867,6306278


Dallenbaugh's Butte, Summerville Formation, Labyrinth Canyon section, Green River (~mm 101) – photo by Andy Buddington, Spokane Community College

From the Field

Columnar joining in dacite along the Sea to Sky Highway between Vancouver and Whistler. It's interpreted as cooling rapidly under a glacier during the last glaciation – photo by Derek Turner, Douglas College, B.C.

Paleochannel in Organ Rock Shale, Stillwater Canyon (Green River, MM~19.5), Canyonlands National Park – photo by Andy Buddington, Spokane Community College

From the Field

The aurora borealis from Yakima, WA on March 30, 2022 – photo by Zach Schierl, Yakima Valley College

Sand dunes above the Columbia River at White Bluffs, WA – photo by Zach Schierl, Yakima Valley College

National Association of Geoscience Teachers PNW Section Conference
June 20-22, 2022

Early Registration Deadline: June 1, 2022
Late Registration Deadline: June 10, 2022
Abstract Deadline: May 23, 2022

Program Itinerary	Early	Late	Student
Monday June 20, 2022 – 8:30AM-4:30PM	**$80**	**$100**	**$20**
Conference Day (5 Professional Development Units)			
Science and Tech Building, Blue Mountain Community College.			
Morning Session – Invited and submitted presentations			
Lunch, Posters & Business Meeting			
Afternoon Session – Classroom Workshops, Invited and submitted presentations			
Dinner/Social	**$25/Person**		
Keynote Speaker – Ellen Morris Bishop			
Tuesday, June 21, 2022, 8:15AM-5:30PM			
Full day fieldtrip (5 Professional Development Units)	**$40**	**$50**	**$20**
Tower Mountain Volcanic complex.			

The field trip will head south over the Blue Mountain anticline into the Ukiah Valley and then east to the Tower Mountain volcano complex. Rhyolite and dacite domes, and lahars from a caldera forming eruption 32 Ma are exposed and can be viewed from the road. After a box lunch (included), the trip will stop at andesite and rhyolite flows associated with Tower Mountain, and the Permian Elkhorn Ridge Argillite.

Wednesday Morning, June 22, 2022, 8:15AM-12:30PM			
½ day Field Trip (2 Professional Development Units)	**$20**	**$20**	**$10**
Reith Anticline and Columbia River Basalt.			

The field trip on Friday will head west where the Umatilla River canyon cuts through the Reith Anticline, exposing the Grande Ronde and Wanapum Layers of the Columbia River Basalt.

Wednesday Afternoon, June 22, 2022, 2:00PM-5:30PM			
½ day Field Trip (1 Professional Development Unit)	**$20**	**$20**	**$10**
Mountain Home Metamorphic Complex.			

The Mountain Home Metamorphic Complex represent some of the oldest basement rocks in the region and are comprised of variably metamorphosed Permian and Triassic aged igneous and sedimentary rocks. Although initially associated with either the Baker terrane or the Wallowa Terrane, more recent work suggests the MHMC may be an island arc terrane that amalgamated onto the Baker Terrane in the Late Jurassic.

Flooding in 2020 limited access to the area. As a result, the field trip will have limited space and will only have one stop.

Registration

If you can pay with a credit card, registration can be completed on line using BMCC's online registration form.
If you are a student or need to pay by check, complete the registration form below

Blue Mountain COMMUNITY COLLEGE
EDUCATION • CONNECTED

REGISTRATION FORM

Last Name:_____ **First Name:** _____ **MI:** _____

Mailing Address:_____**City:**_____ **St:**_____ **Zip:**_____

Email Address: _____ **Home/Cell Phone:** _____

Event	Time	Date	Fee (Reg Late Student)	Number	Subtotal
Conference Day	8:30AM-4:30PM	6/20/2022	$80 $100 $20t		
Evening Banquet	6:00PM=8:00PM	6/20/2022	$25/person		
	Dietary Restrictions?				
Tuesday Fieldtrip	8:15AM=5:30PM	6/21/2022	$40 $50 $20		
Wednesday AM Field Trip	8:15AM=12:30PM	6/22/2022	$20 $20 $10		
Wednesday PM Field Trip	2:00PM=5:30PM	6/22/2022	$20 $20 $10		
				Total =	

Student Signature (Required):_____ **Date:** _____

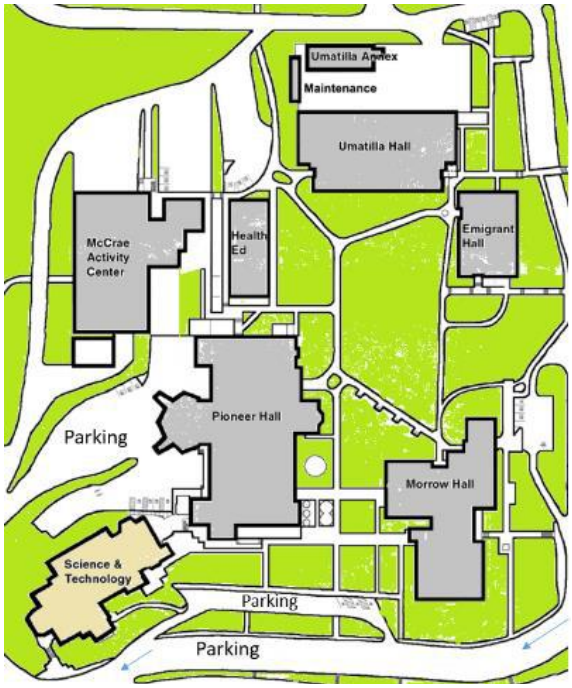
Send the following page and remit with the conference fees to:

NAGT conference c/o Philip Schmitz
Blue Mountain Community College
PO Box 100
Pendleton, OR 97801

Lodging
Due to other events occurring in Pendleton, room availability may be reduced. A block of rooms has been reserved at the Pendleton Best Western Hotel Individuals must make their own reservations by calling **the Hotel Direct at 541-276-2135** by 06/10/2022. Please identify as a member of NAGT. Reservations must be guaranteed and accompanied by a first night room deposit or guaranteed with a major credit card.

Directions to BMCC
Pendleton is located on I-84 approximately mid-way between Boise, Idaho (223 miles) and Portland, Oregon (210 miles). Pendleton has a small regional airport with multiple daily flights to Portland International Airport (PDX).

The Conference location and field trip meeting points will be the Science and Tech Building located on the Southwest Side of the Pendleton Campus



About Blue Mountain Community College:
Blue Mountain Community College was originally established in 1962 to provide vocational-technical and college transfer courses. Today BMCC serves six counties in Northeastern Oregon with five centers and over 400 asynchronous and synchronous distance education courses.

Pendleton is in the Columbia River Basin and is surrounded by Columbia River Basalts. North and west of Pendleton, the anticlines of the Yakima Fold Belt carved by the Ice Age Floods, while the synclines became repositories of Pleistocene sediments. East and south of Pendleton, the axis of the Blue Mountain anticline forms the core of the Blue Mountains; further south, there are volcanic rocks from the Oligocene as well as exposures of the Bald Mountain Batholith, the Baker Terrain, Picture Gorge Basalts, and the John Day Fossil Beds.

What else is there to do in Pendleton:
Pendleton is famous for its week long rodeo, the Pendleton Round-Up, but there are other Pendleton attractions such as the Pendleton Underground, Pendleton Woolen Mills, and Hamley's Saddle Company which pay homage to the history and heritage of the American West. Pendleton has numerous city parks and a new mountain biking trail system near the airport.

Nearby, the Confederated Tribe of the Umatilla Indian Reservation operates a casino and golf course, the Walla Walla basin has an emerging agri-tourism industry featuring wineries and fruit orchards, and the Umatilla and Wallowa National Forests provide opportunities for swimming, rafting, fishing, hiking, and camping.