

# Nature Trails

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## **The Really Big One: How Did It Come to This?**

**Chris Goldfinger  
Professor of Marine Geology  
Oregon State University**

**Friday, 17 November 2017, 7:30pm,  
Room 100 Willamette Hall, UO Campus**

Chris Goldfinger is a marine geologist and geophysicist with a focus on great earthquakes and plate boundary fault zones around the world. He grew up in Palo Alto and was exposed to earth and planetary sciences from an early age since his father worked at NASA. Contrary to what you might expect he did not go to Stanford. He finished his undergraduate education in 1980 at Humboldt State University in Arcata, California. He received two degrees, a B.S. in geology and a second B.S. in oceanography. Goldfinger earned his M.S. in structural geology at Oregon State University. His Ph.D., in structural geology/geophysics, also from OSU, was granted in 1994.

OSU must have realized that Goldfinger had extraordinary potential, since they never let him escape. He has spent his entire academic career there. After getting his Ph.D. he immediately began a postdoctoral research associateship in the same department, and after just a single year in that position became an assistant professor of oceanography.

Now a full professor, Goldfinger's research interests are broad, including subduction earthquakes, earthquake recurrence, active oblique faulting and block rotation in the Cascadia subduction zone, and paleoseismology.

This is not a complete list, but I broke in here because paleoseismology has an interesting ring to it. Paleo means old, old in the geologic sense. Seismology is the study of earthquakes, so paleoseismology is the study of ancient earthquakes, and marine paleoseismology is the study of ancient earthquakes that took place on seafloors. This is a young branch of science. Practitioners of paleoseismology are focused on events that took place eons ago, yet the discipline itself is so new it didn't even exist 50 years ago. The title of Goldfinger's talk—The Really Big One: How Did It Come to This—implies a systematic study of local earthquakes back into the distant past and what predictive power such knowledge allows—clearly this is paleoseismology couched in layman's terms.

Goldfinger heads the Active Tectonics and Seafloor Mapping Lab in OSU's College of Oceanic and Atmospheric Sciences. Funding of the Lab's research efforts has come from many sources, including NSF, NASA's Solid Earth and Natural Hazards Program, the USGS National Earthquake Reduction Hazards Program, and the American Chemical Society. None of these agencies is an easy touch, and they have collectively supported Goldfinger and his collaborators to the tune of several millions of dollars. Publications resulting from their research number in the hundreds. One of them, "Turbidite

event history—Methods and implications for Holocene paleoseismicity of the Cascadia subduction zone: USGS Professional Paper 1661-F," won the 2016 Kirk Bryan Award, given by the Geological Society of America for work of special distinction in quaternary geology. The citation said, in part, "From the perspective of the Quaternary specialty of paleoseismology, Goldfinger et al. (2012) is one of the most important papers to appear since the development of this research specialty in the early 1970s. The paper is one of a handful describing enough evidence for large earthquakes over a span of time sufficient to model the recurrence of large earthquakes and how earthquakes may cluster in time due to changing patterns of stress accumulation and release on long faults." The citation also praised Goldfinger's group for four major accomplishments, two of which relate directly to increased awareness of the public of the clear dangers we in the Cascadia region face: "The research summarized by Goldfinger et al. (2012) has played a key role in (1) the development of marine paleoseismology, (2) the increasing influence of Quaternary stratigraphy and (submarine) geomorphology in earthquake and tsunami hazard assessment and subsequent hazard mitigation, (3) *the greater and more frequent media attention to hazard and other applied Quaternary studies, and (4) the resulting greater public appreciation of the value of Quaternary geology to society. Despite the explosion in the twenty-first century of convincing Quaternary stratigraphic data dated with dramatically increased precision, few papers of the past 15 years rival Goldfinger et al. (2012) in their scope, influence on the assessment of natural hazards, and importance in demonstrating the societal value of Quaternary studies* [italics added]." This is turgid stuff, but a couple of points are clear: first, Goldfinger and his collaborators are at the top of their field. And second, we the public in the Pacific Northwest need to pay close attention to what they tell us.

Goldfinger has employed deep submersibles, sidescan sonar, seismic reflection, and other marine geophysical tools on over 40 oceanographic cruises over the last 25 years. He is currently working on great subduction earthquakes along the Cascadia, NE Japan, the Caribbean, and Sumatran margins, as well as the Northern San Andreas Fault off northern California using the evidence for earthquakes found in deep-sea sediments. This work is developing methods for submarine paleoseismology in locales where plate boundaries are submerged. The Cascadia work was the topic of a recent National Science Foundation Distinguished Lecturer Series [and the

aforementioned Kirk Bryan Award for Quaternary Geology].

Among Goldfinger's many public presentations is a TED talk entitled Toast, Tsunamis and the Really Big One. Here's a link:

<https://www.youtube.com/watch?v=Iy5a2P3zXl4>.

In his talk to us he will explain the methods he and his group have developed that have allowed them to determine how many major earthquakes have occurred in Cascadia over the past several thousand years, and, importantly, the intervals between them.

He makes clear that for our region—from Southern British Columbia to Northern California—the question is not *if* we will again experience a cataclysmic earthquake. We can be certain that it will occur. The all-important question is *when*. We are past due, and we are not ready.

You do not want to miss this presentation. Please join us at 7:30pm on Friday, 17 November in room 100 Willamette Hall to hear Professor Chris Goldfinger's talk, "The Really Big One: How Did It Come to This?" John Carter

## In Search of a Living Forest

- by August Jackson

A Pacific sideband snail (*Monadenia fidelis*) grazes on budding lichens clinging to a shed twig. This is the Pacific coast's largest terrestrial mollusc, and the first terrestrial being I've encountered in



six seasons mining Pacific golden chanterelles in this tree farm masquerading as a forest. On occasion I hear a Pileated Woodpecker call from the unkempt and just wide enough woods between road and creek below—a buffer spared the saw by a moment of foresight and hard-fought legislation. But near the crest of this coast range hill, where a dead forest clings to life, the snail and I sit in unnatural silence atop an inch of duff covering sandstone made from the shells of its marine cousins. The understory is barren even of sword ferns, making the search for mushrooms easy, and I return every year to this farm with the illusion that it is my own and to join in the unbridled optimism of golden chanterelles that believe in a forest that is alive.

In the forests of Western Oregon, economics and biology intersect where the chisel-bit of a chainsaw meets the 40th ring of western hemlock wood, and these trees are reaching the age at which their growth curve begins to dip into diminishing returns. So I am unsurprised to return and find the almost imperceptible network of old roads carved into the

uplifted sandstone to be freshly resurfaced with gravel from a different geological epoch and thirty miles to the east. One extractive industry to support another. New blue flags speak volumes in a language I recognize, and while right now the resurfaced road ends a few hundred yards from us, it represents the end of the road for the snail and the chanterelles. I'm walking death row gathering last supper leftovers.

For this individual it will be the first and last experience with the tread of heavy machinery, but as a biological unit, this is a common story for the Pacific sideband snail. Despite their impressive lifespan, these snails do not move significant distances, and the cut and furrowed coast range terrain has isolated populations of the species and carved indelible marks into the folds of its DNA. Several subspecies exist and have their existence threatened by the fatal efficiency of modern forestry practices.

The cyclical conveyance of timber to circular saws is the life force of a dead forest. Several decades ago every marketable tree was removed and the slash burned. Slipping on the decaying sandstone, laborers worked uphill unfurling an even-spaced turf of western hemlock saplings—a climax forest without the foreplay. Initially disregarded as low-grade lumber, the depletion of ancient forests and a subsequent shift in forestry practices has made western hemlock a darling in coast range timber stands. Remarkably shade tolerant, they can grow in one another's shadow with little mortality, enabling denser plantings than possible with Douglas-fir. Under normal conditions, western hemlocks may not reach an ascendant position in a forest for several hundred years. They are the quintessential nurse log adornments—forest giants that have worked out a niche as a temporary component of the understory, quiescent until conditions change. It may be decades and only a few vertical feet of growth before a western hemlock's roots mingle with chanterelle mycelium, a Douglas-fir is toppled by wind, and the first rays of unfiltered sunlight turn a shrub to a tree. These are forest understudies thrust into a starring



role on timberlands, and the ecological effects are jarring.

As I sit and watch it graze, I marvel at the snail's ungulate appearance and fall in love. But I can't bring myself to feel as deeply about the fate of this forest. Whether standing or felled, it is, and has been since the day it was planted, a dead forest. The snail, the chanterelles and the western hemlocks deserve better than this and at the very least a clear-cut here represents the chance for a new beginning. I want a forest that lives before it dies. I want a forest that feels like home, builds homes, and is home to generations of Pacific sideband snails. I want my

### **Rescuing Monarchs, Transhumance, and Healing Our Planet** by Reida Kimmel

Our family in Minnesota rescues monarch butterflies. Dick and Sue collect monarch caterpillars from sites where mowing and herbicides will kill them, and place them in a netted butterfly cage in their home. They feed the caterpillars with an abundance of milkweed gathered from clean sites. Eventually the caterpillars make lovely pale green and gold chrysalises, and hanging from a golden thread, they remain safe until they are ready to be butterflies. Then, when the monarchs emerge, they are released to fly to Mexico.

Saving the earth one butterfly at a time may seem quixotic, but it is a step, one of millions that must be made to protect as much as possible of our challenged lovely planet. In our homes and communities we can choose projects to heal the earth. And we have help. Here in Oregon we are very fortunate in having non-governmental organizations, deserving of our support, that take on the burden of protecting land in unique ways. Space does not permit the listing of all the wonderful groups trying to do their part in warding off impending global catastrophes. All these organizations welcome volunteers and sponsor meaningful and enjoyable activities.

One such group is the Nature Conservancy, with wetlands as close as West 18<sup>th</sup> Street and other holdings throughout the nation and hemisphere. The Nature Conservancy has day trips and volunteer activities locally, and it also sponsors "Journeys" to properties elsewhere in Oregon. In early June we went on a Nature Conservancy trip to the Zumwalt Prairie in far northeast Oregon. We used to love backpacking in the area. In our youth, our eyes fixed on Eagle Cap, we had never noticed the prairie. How could we have missed an area of 240,000 square miles, 4,440 acres of it designated as a National Natural Landmark! I knew that the Conservancy had purchased fifty-one square miles of the prairie some

lumber, my chanterelles, and my salmon from the same forest. Our forests, our timber industry, and our rural communities won't live until they provide all of these values. This forest will be cut, and it will be replanted, and it will not re-open rusting sawmills. Dead forests are unequivocally unable to provide, and I take comfort in the thought that maybe this is the last time this forest will be replanted as a crop and forgotten, only to be remembered at harvest time. I leave the Pacific sideband snail, rising to take a final walk under these trees, feeding on the optimism of chanterelles that believe in a forest that is alive.

years ago, but that is all I knew. We were in for a treat. It was the best time for flowers and the best bloom season in years. Raptors abounded. The scenery was breathtaking. But it was a trip about people too, and we met wonderful people, ranchers and residents of Joseph. When we backpacked thirty years ago, we brought all we needed and never stopped to visit with anyone.

Zumwalt Prairie is a vast rolling expanse extending almost to the edge of Hells Canyon. It has numerous steep, narrow canyons where fir and deciduous trees grow. It differs from prairies east of the Rockies because its thin soils have never been plowed. Elk and deer were the native grazers, not bison. Basalt rocks protrude from the soil, making walking tricky. Rainfall is sparse, fifteen or seventeen inches a year. The soil is not water retentive. Summers are moderately hot. Winters are brutally cold. Most of the precipitation falls in winter. The Nez Perce, the prairie's original inhabitants, used the prairie for hunting and gathering in spring and fall. Today most of the prairie is privately owned by cattle ranchers, who use it for summer grazing.

The first day of our 'journey' we started at the bottom of a narrow canyon where Camp Creek flows by an old ranch house sheltered by an ancient walnut tree. A steep, winding road up Trail Creek took us to the heart of the Conservancy's Zumwalt Prairie



property. There a beautiful old barn, Duckett Barn, provides shade and shelter. A kiosk posts information

about the trails, most of which are loops and begin in the vicinity. Across the landscape there are enclosures around young aspen groves. The elk must

be fenced out if the aspens are ever to thrive. There are not enough wolves in the area to do that job yet. We took several walks and were astounded by the variety of wildflower species. In one wet meadow the air was suffused with the scent of thousands of blooming camas plants. I could not resist lying down amongst them, drinking in the aroma more deeply.

The next day began at another Conservancy ranch, Summer Camp, where the huge barn was full of elk antlers. Not such a grim spectacle after all, as the local kids collect them after they are shed, and money from their big sale is used to fund various projects for the schools. It was at Summer Camp that our serious education about the prairie, the ranchers and the Conservancy began. Most of the Conservancy's land is leased to ranchers. Over all, only a small proportion of the prairie has ever been used for crops. The rest is used in a very traditional manner as we learned from our lunchtime conversations with a ranching family partnered with the Conservancy. In the winter the cattle, especially bred to thrive in Zumwalt's challenging climate, are herded down into the Imnaha area bordering Hells Canyon to graze for the winter. The families go with them, living in town or more often, staying with the cattle, isolated on winter ranches with few amenities, home schooling the children. In spring, the grasses green, with the invasive species like cheatgrass providing nourishment for a short while. The strategy is to see the invasives grazed down early and for them to be replaced by the native Idaho fescue, Bluebunch wheatgrass, and Sandberg's bluegrass, which are

nourishing for most of the year. As May begins and the calves are born, the ranchers herd the thousands of cattle that have wintered in the lowlands back up to the prairie, two or more thousand feet above the wintering grounds. Tough cows. Tough babies! On the prairie, early invasive species are ready for grazing, it is hoped to the bare earth. The native species will replace them with rich forage through summer and early fall. This is transhumance, practiced as it was in ancient times. The ranchers grow wonderful meat, wholesomely fed on natural grass from birth to slaughter. The families love their lives and livelihood. Their children want to stay in the ranching business. But this way of life is endangered. Properties that are subdivided for housing and businesses are worth more than ranchland. It is very tempting to sell. College-educated youngsters wonder how they can make a living doing what they love. Here is where the Conservancy is helping. It knows that if the ranching families leave and the prairie is developed it will be lost, just as the rich farming lands of the southern Willamette Valley have been lost to highways and sprawl. To keep the prairie intact both biologically and culturally, the Conservancy is partnering with ranchers, arranging conservation easements and striving to find ways to market the fresh meat over a wider area, hoping to distribute it nationally. Creative and ambitious, the plan might be the only way to save the Zumwalt Prairie's ecosystem and unique way of life, not just a small museum piece of it.

From Oregon Environmental News:

Oregon wildlife and health officials are warning beachgoers to be aware of sick and stranded California sea lions at the coast and to keep their distance.

Officials at [Oregon State University's Marine Mammal Institute](#) said they've documented a [leptospirosis](#) outbreak. The bacteria can prompt sick or dying sea lions to strand themselves on beaches and can also pose a threat to dogs, livestock and wildlife, as well as people.

## Events of Interest in the Community

### Lane County Audubon Society

**Saturday, 18 November, 8am-noon. Third Saturday Bird Walk.** FMI: Jim Maloney at 541.968.9249 or [jimgmal@comcast.net](mailto:jimgmal@comcast.net).

**Tuesday, 28 November, 7:30pm. Birding the Border Country: Lake, Harney, Washoe and Humboldt Counties.** John Shewey, a freelance writer and photographer, has explored the border country—that vast, remote region encompassing southeastern Oregon and northwestern Nevada—for decades. Run the risk of catching his infectious enthusiasm by coming to his presentation celebrating the diversity of this area. Eugene Garden Club, 1645 High St. For a more complete summary go to <http://www.laneaudubon.org/> and click on the link to the November issue of the Quail.

### Mt. Pisgah Arboretum

**Saturday, 11 November, 10am-3pm. Play in the Rain Day.** Discover how fun, easy, and rewarding it is to spend time outdoors in nature—in ALL kinds of weather. Play in the Rain Day will happen rain or shine, so dress for the weather. FREE!  
**Saturday, 18 November, 10am-2pm. Herbal Medicines for Colds and Flus Workshop.** Led by Anna Bradley. Herbs we

will be working with include Oregon grape root, Echinacea, Mullein, and more. Take home recipes, formulas, and new methods for you and your family. Meet at the Visitor Center. Members \$25, Non-members \$30. Pre-registration required. To register call 541-747-3817 or go to: <http://www.mountpisgaharboretum.com/workshop-registration>

**Sunday, 19 November, 8-11am. Bird Walk Sunday.** Join Julia Siporin and Joni Dawning for another monthly bird walk intended for people with all levels of birding experience. We'll use vocalizations, habitat, and behavior clues for identification of our fall migrants and year-round residents. 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. \$5, members free.

**Saturday, 9 December, 10am-12pm. Mushroom Walk.** It's still mushroom season! Take a walk through the Arboretum's forested trails with experienced mycologists, Chris Melotti and Molly Widmer of the Cascade Mycological Society, and hunt for these fascinating fungi. Discuss identification, habitat, characteristics, natural history and the role of fungi within an ecosystem. Meet at the Arboretum Visitor Center. Rain or shine. \$5, members free.

### **Friends of Buford Park and Mt. Pisgah**

**Monday Morning Regulars, 9am-noon.** Contact [volunteer@bufordpark.org](mailto:volunteer@bufordpark.org) for more information.

**Tuesdays and Thursdays, 9am-noon. 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)**

**Saturday, 11 November, 10am-3pm. Play in The Rain Day.** Play in the Rain Day is a free community event at Mt. Pisgah Arboretum for families of all ages to play outdoors, rain or shine, and connect with nature. Activities include tree climbing, archery, campfire cookery, nature exploration / hikes, nature crafts, backcountry horse demos, hayrides, scavenger hunts, Smokey Bear, and more. Parking is free courtesy of Lane County Parks.

### **The University of Oregon's Museum of Natural and Cultural History**

**[Wolves and Wild Lands in the 21st Century.](#)** How can wolves and people coexist in our modern world? From Alaska to Oregon to North Carolina, explore the epic story of North America's wolves—and the vital role humans play in shaping their future. On exhibit 11 August 2017 through 11 February 2018. Exhibit Hours: Tuesday through Sunday, 11am-5pm.

### **Native Plant Society of Oregon, Emerald Chapter**

**Saturday, 18 November, 6:30pm. Meadow Restoration on the Middle Fork District.** Botanist Molly Juillerat of the US Forest Service will focus this talk on maintaining meadow species and plant diversity. Come see how the Middle Fork is restoring meadows to encourage and diversify plant and animal species. Location: M.L.I. room, Building C of the Amazon Community Center at 2700 Hilyard in Eugene. For more information call 541-954-5334.

### **Nearby Nature**

**Saturday, 11 November, 10am-3pm. Play in The Rain Day.** Play in the Rain Day is a free community event at Mt. Pisgah Arboretum for families of all ages to play outdoors, rain or shine, and connect with nature. Activities include tree climbing, archery, campfire cookery, nature exploration / hikes, nature crafts, backcountry horse demos, hayrides, scavenger hunts, Smokey Bear, and more. Parking is free courtesy of Lane County Parks.

**Saturday, 11 November, 10am-1pm. Restoration Celebration.** Participate in community service this Veteran's Day by joining Nearby Nature volunteers in the stewardship of high value habitat areas in Alton Baker Park's Whilamut Natural Area. We work to maintain and improve trail systems, restore areas that have been damaged by over use, and remove invasive species to increase biological diversity. The meeting location for this work party will be at the Park Host House of Alton Baker Park, located at 622 Day Island Road. Bring a water bottle and dress for the weather and for outdoor work in thorny plants. Nearby Nature will provide tools, gloves, and snacks for this event.

Please RSVP for this event at <http://www.nearbynature.org/registration-scholarship-forms/work-parties>

**Monday, 20 November, 10-11:30am. Green Start Play Day.** Enjoy outside nature play in our Learnscape plus pre-school crafts and stories. Rain or shine! Indoor area available for wet weather. Kids 5 and under only, with an adult. Members free, non-members \$5/family (adult and pre-schoolers). Meet by the yurt in our Learnscape at Alton Baker Park. Pre-register: 541-687-969

**Tuesday, 5 December, 12-9pm. Ninkasi Pints for a Cause for Nearby Nature.** Join us for a fundraiser at Ninkasi! Make your way to the Ninkasi Tasting Room at 272 Van Buren Street in Eugene. \$1 from every pint sold will be donated to Nearby Nature on this day. Join us and bring a friend!

### **North American Butterfly Association, Eugene/Springfield Chapter**

For information on NABA's November meeting go to <http://www.naba.org/chapters/nabaes/>

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

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State & Zip \_\_\_\_\_ Phone \_\_\_\_\_

E-mail (if you want to receive announcements) \_\_\_\_\_

I (we) prefer electronic copies of NT rather than paper copies. \_\_\_ Yes \_\_\_ No

If yes, email address (if different from the one above): \_\_\_\_\_

ANNUAL DUES: Family \$25.00  
Individual 15.00  
Life Membership 300.00  
Contribution \_\_\_\_\_

**Annual dues for renewing members are payable in September. Memberships run from September to September. Generosity is encouraged and appreciated.**

Make checks payable to:  
Eugene Natural History Society  
P.O. Box 5494, Eugene OR 97405

A good place to park for our meetings is the Physical Plant lot: turn north from Franklin onto Onyx, go about a block and you will be in the lot. After 6pm it's open to the public.

NOTE: If you haven't paid your dues, this will be your last issue.





Volunteers search a building that collapsed after an earthquake in the Roma neighborhood of Mexico City on 19 September 2017. Photo by Eduardo Verdugo/ AP

### ENHS Officers and Board Members 2017-2018

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### Schedule of Speakers and Topics for 2017-2018

17 Nov.	Chris Goldfinger	The Really Big One: How Did It Come to This?
8 Dec.	Matthew Betts	Hummingbird Highways: Why Landscape Connections Matter to Pollination in the Tropics
19 Jan.	Nathan Reynolds	Mountain Goats Return to <i>Lawetlat'la</i> (Mt. St. Helens)!
16 Feb.	Gayle Hansen	Seaweeds on Japanese Tsunami Debris: Have They Invaded Our Shores?
16 March	Leigh Torres	Insights into Whale Ecology
20 April	Fred Swanson	Humanities, Arts, Science Collide at Andrews Forest, Mount St. Helens, and Beyond
18 May	Ron Larson	The Natural History of Lake Abert, Oregon's Salt Lake