Licensing for Geology Careers in Oregon

Oregon State Board of Geologist Examiners

Professionals in Service to Oregonians Since 1977

Photo credit: Emily Cahoon

Presenters

Christine Valentine

OSBGE Administrator
(Exec. Director)

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Member

What do we have to offer today? Information about:

- ✓ Why registration (i.e., licensure) exists.
- ✓ What registration can do for you.
- ✓ The pathway to registration and types of registration.
- ✓ Some general information about geology careers.

1. History and Importance of Licensure
2. Registration Types
3. Benefits of Licensure
4. How to Become Licensed
5. Geology Career Resources

Photo credit: Alex Lopez

Audience Questions

How many juniors or seniors are here?

How many of you hope to start a career right after obtaining your Bachelor’s

Has anyone heard anything about professional licensure for geologists before?

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2. Registration Types
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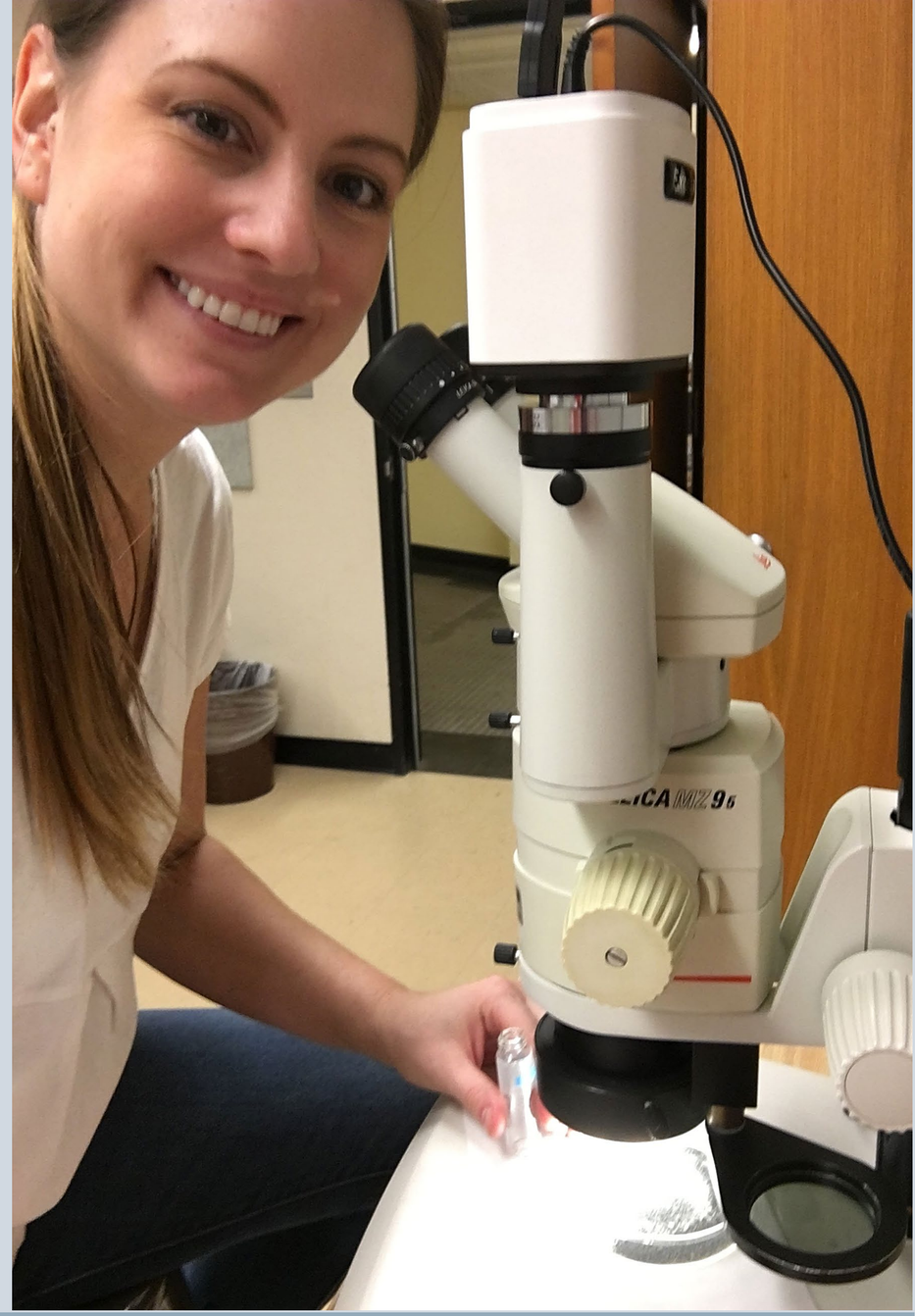


Photo credit: Chanel Dvorak

Photo credit: Fox19

Laws governing practice of geology in Oregon enacted 1977

- ✓ Establish minimum standards of **competency**
- ✓ Create **legal responsibility** for work performed
- ✓ In order to protect the health, safety, property, and welfare of the public

Oregon Administrative Rules Chapter 809

Oregon Revised Statutes 672.505 to 672.991

Public Practice in Oregon

Who must be registered?

- ✓ Those who perform geological service or work related to public welfare or safeguarding of life, health, property, and environment

Who is exempted?

- ✓ Federal or tribal employees
- ✓ University professors – teaching/research
- ✓ Subordinates to RGs and CEGs
- ✓ Private citizens providing testimony at public hearings

How to Establish Competence?

Each state board makes its own requirements.

Generally:

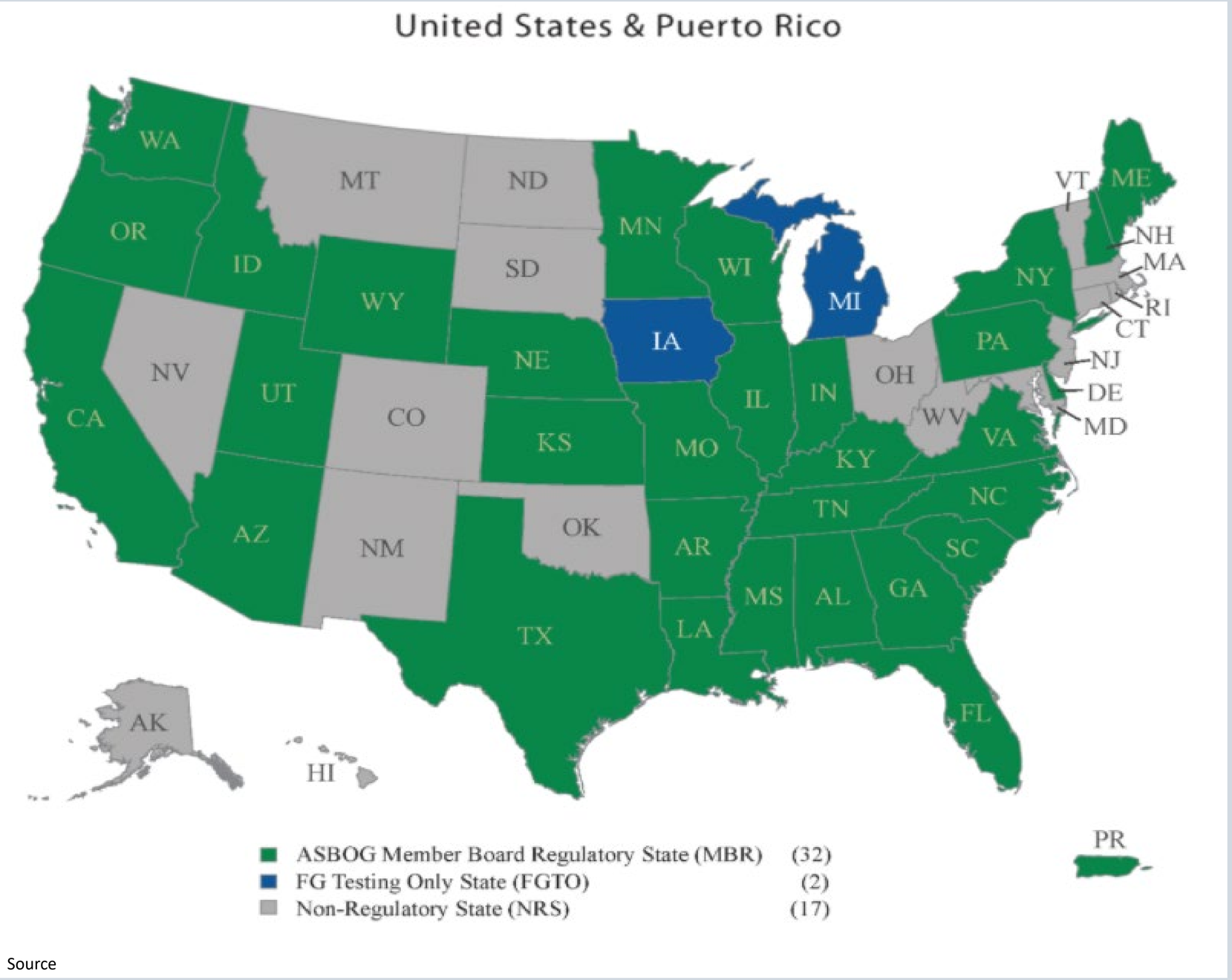
- ✓ Post-secondary education
- ✓ Work experience
- ✓ Pass two national exams
- ✓ Additional exam for specialty licenses

Photo credit: Chanel Dvorak

National Association of State Boards of Geology (ASBOG)

- ✓ A separate entity from state licensure boards
- ✓ ASBOG does not grant licenses; they are an examination body
- ✓ ASBOG Council of Examiners meets twice per year to review exam sections
- ✓ ASBOG exam sections:
  - Fundamentals of Geology (FG)
  - Practice of Geology (PG)

National Association of State Boards of Geology



Source

ASBOG exam & registration (licensure) required in 32 member states & Puerto Rico.

Oregon has required registration since 1978 and been an ASBOG member since 1990.

1 History and Importance of Licensure

2 Registration Types

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Photo credit: Emily Cahoon

Registration Types in Oregon

Geologist-in-Training (GIT)

Registered Geologist (RG)

Certified Engineering Geologist (CEG)

Specialty License

Photo credit: Chanel Dvorak

Oregon Statistics:

100 GITs

900 RGs

185 CEGs

~50% of RGs and CEGs

are out of state.

Data as of 5/2023

Source

Photo credit: Keith Kohl, ODFW

Geologist-in-Training (GIT)

- ✓ Education + pass the ASBOG FG
- ✓ Optional; title use registration
- ✓ Not a practice registration (i.e., must work under supervision of RG or CEG)
- ✓ Subject to code of professional conduct
- ✓ Stepping-stone to RG

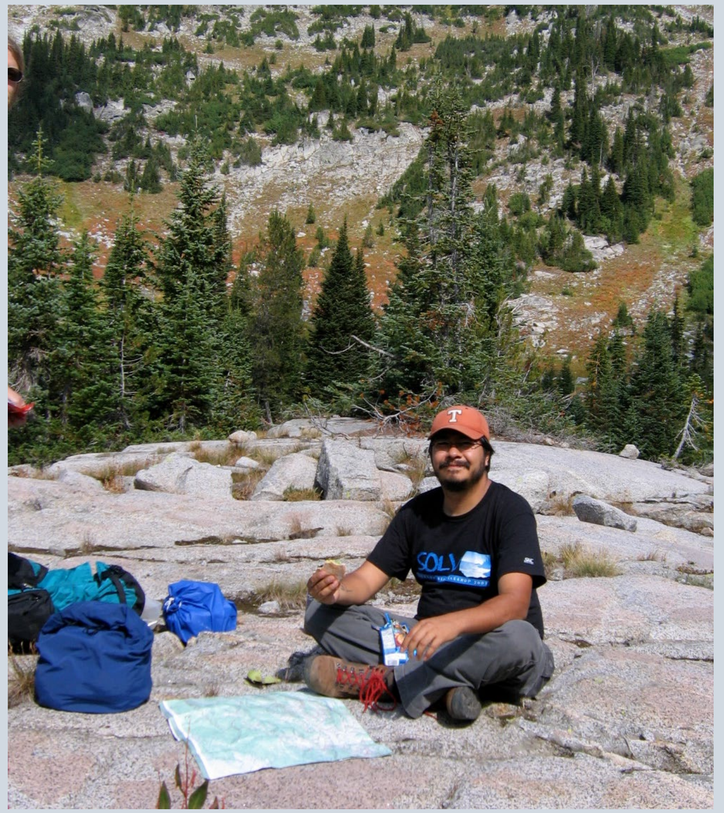


Photo credit: Alex Lopez

Geologist-in-Training (GIT)

So… what's the point?

- ✓ Show intent
- ✓ Build technical competence
- ✓ Understand regulations
- ✓ Spread out 8 hours of exams
- ✓ Prepares you for format of next exam

Photo credit: Shutterstock

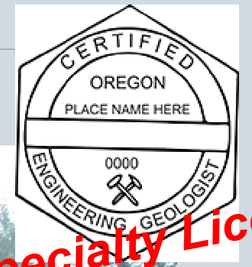
Registered Geologist (RG)

- ✓ Education + experience + pass the FG + PG
- ✓ Independent public practice in responsible charge
- ✓ Can stamp, sign, and date reports
- ✓ Can advertise that a RG

Photo credit: Megan Schettler

Certified Engineering Geologist (CEG)

- ✓ Pass FG + RG + specialty exam
- ✓ CEGs must be RGs first!
- ✓ Additional authorization to develop, supervise and stamp work that falls under the definition of engineering geology
- ✓ Bridge foundation, landslide repair, residential dwellings, etc.



Specialty License

Photo credit: wou.edu

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Photo credit: Vanessa Swenton

What can licensure do for me?

- ✓ Required in the majority of U.S. states
- ✓ Increases career opportunities and independence
- ✓ Demonstrates professional responsibility and increases credibility
- ✓ Financial incentive

Preferred Qualifications:

- Master's Degree in Hydrogeology, Geochemistry, Geology, Environmental Science, or related field
- Geologist-In-Training (GIT) or Registered Geologist (RG) license
- 2-4 years of environmental consulting experience
- Quantitative data analysis experience, including flow and transport models, statistical analysis, GIS, or scientific coding (R or Python)
- Current OSHA HAZWOPER 40 hr / 8 hr training

- Desired:
- + Prior project experience in the Pacific Northwest is highly desired.+ A Master's Degree in environmental science/hydrogeology, geology, geosciences, or similar field.+ Strong computer skills, including Microsoft Excel, Word, PowerPoint, Access, ArcGIS, MODFLOW, R, Python, etc.+ Strong project management experience of multi-disciplinary teams.+ Experience with environmental statistics and site closure strategies is highly desired.+ Professional Engineer (PE) and/or Professional Geologist (PG) and/or Licensed Hydrogeologist (LHg) and/or Certified Water Rights Examiner (CWRE).+

Other reasons people get licensed:

- ✓ *I started on the academia track and decided to work in industry instead of finishing my PhD. Once here, I wanted to achieve the highest professional certification in our field: the RG.*

Photo credit: Marli Miller

Other reasons people get licensed:

- ✓ *I wanted extra credibility. I also needed to be able to stamp applications for well installations, so the RG expanded my job functions.*
- ✓ *I became licensed to make myself more marketable. I'm on a technical career track, and at a certain point I felt that wouldn't look good I weren't a licensed professional.*

Photo credit: Marli Miller

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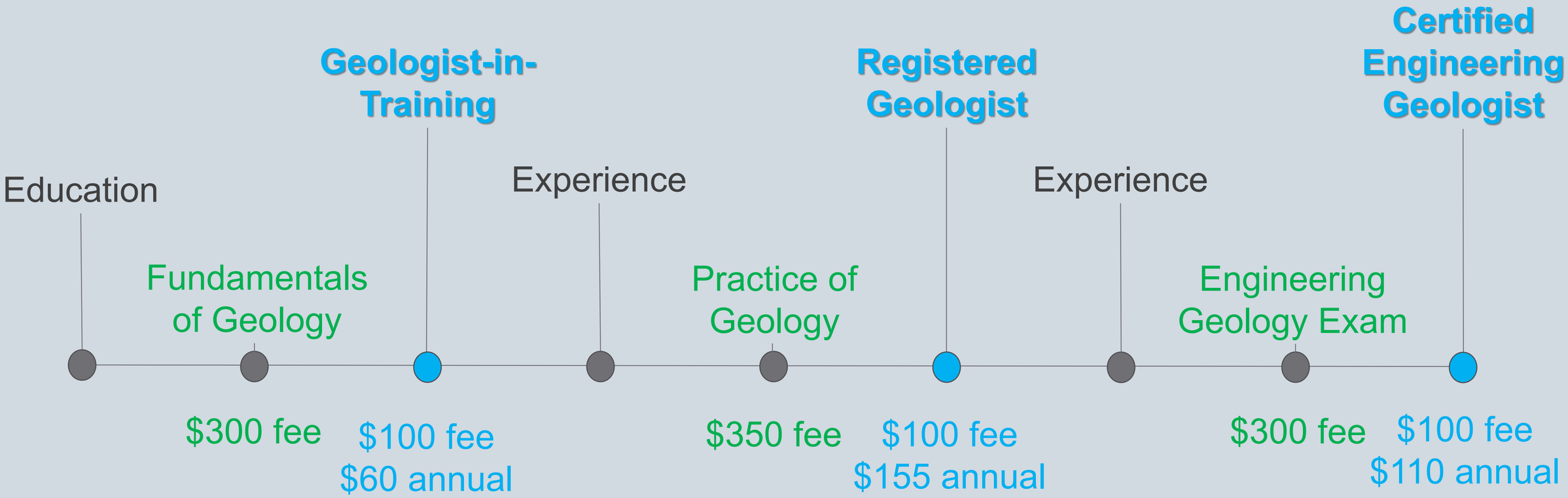
Pathway to Registration in Oregon



Geoscience Coursework

MINIMUM 45 quarter hours (36 upper division) or 30 semester hours (24 upper division)

- Climate change science
- Coastal processes
- Economic geology
- Engineering geology
- Environmental geology
- Geochemistry or Hydrogeochemistry
- Geographic Information Systems (GIS)
- Geology field camp
- Geology field methods
- Geomorphology
- Geophysics
- Geostatistics
- Glacial geology
- Groundwater hydrology
- Groundwater modelling
- Historical geology
- Hydrogeology
- Lithology
- Marine geology
- Mineral exploration
- Mineralogy, Optical mineralogy, or Clay mineralogy
- Paleopedology/Paleosols
- Petrography
- Petroleum geology
- Petrology
- Planetology
- Remote sensing
- Rock mechanics
- Sedimentology
- Seismology
- Soil Science
- Stratigraphy
- Structural geology
- Tectonics
- Volcanology

Photo credit: Shutterstock

ASBOG Fundamentals (FG) Exam

- ✓ 4-hour exam
- ✓ 140 multiple choice questions
- ✓ Undergraduate knowledge and skills
- ✓ Can take immediately after completing coursework OR…
- ✓ Pass FG → apply for GIT

ASBOG Practice of Geology (PG)Exam

- ✓ 4-hour exam
- ✓ 110 multiple choice questions
- ✓ Knowledge and skills gained from practice
- ✓ After completing education + work experience
- ✓ Pass FG + PG → apply for RG

***Note:** ASBOG is a separate entity from the Oregon Board! Go to **asbog.org** for more information.*

ASBOG Exam Content Areas

Content Domain	FG %	PG %
A. General & Field Geology	21	20
B. Mineralogy, Petrology, & Geochemistry	11	05
C. Sedimentology, Stratigraphy, & Paleontology	12	06
D. Geomorphology, Surficial Processes, Quaternary Geology	13	08
E. Structure, Tectonics, & Seismology	11	08
F. Hydrogeology	12	19
G. Engineering Geology	11	19
H. Economic Geology & Energy Resources	09	15
TOTALS	**100**	**100**

✓*Visit oregon.gov/osbge for application*

✓*Visit asbog.org for exam information*

Exams Offered Twice per Year

2023 Spring March 17 • 2023 Fall October 6

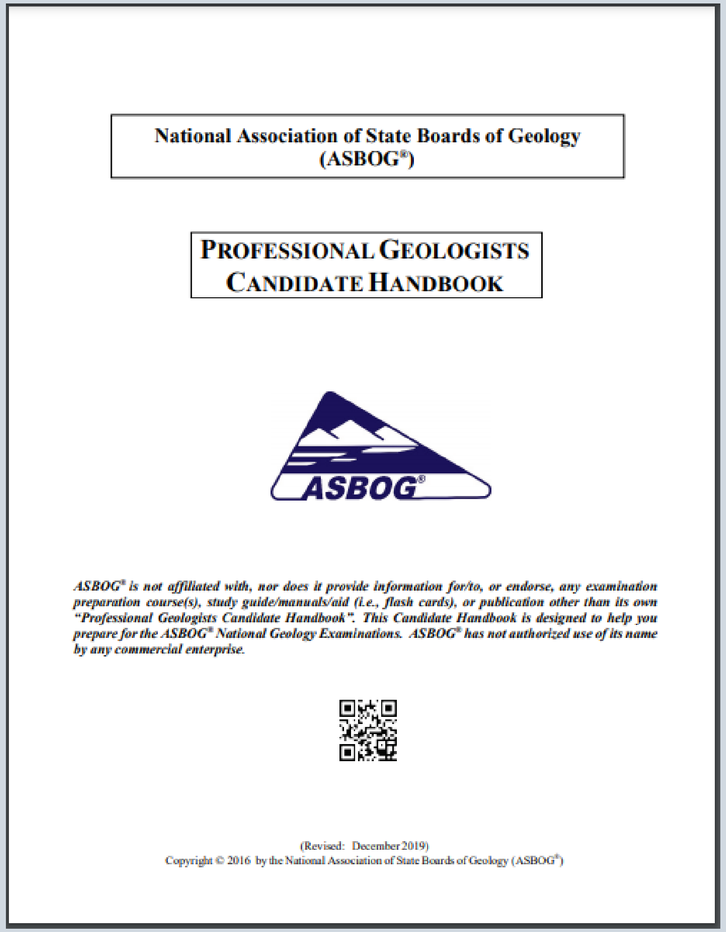
2024 Spring March 15 • 2024 Fall October 4

Applications due to OSBGE 100 days prior to exam!

Resources

ASBOG Candidate Handbook

- ✓ Only official guidance
- ✓ 2023 version available for free at www.asbog.org/candidates/
- ✓ Breakdown of subjects by percent and sample questions
- ✓ Also can find list of other study resources at ASBOG website



National Association of State Boards of Geology (ASBOG®)

PROFESSIONAL GEOLOGISTS CANDIDATE HANDBOOK

ASBOG®

ASBOG® is not affiliated with, nor does it provide information for/to, or endorse, any examination preparation course(s), study guide/manuals/aid (i.e., flash cards), or publication other than its own "Professional Geologists Candidate Handbook". This Candidate Handbook is designed to help you prepare for the ASBOG® National Geology Examinations. ASBOG® has not authorized use of its name by any commercial enterprise.

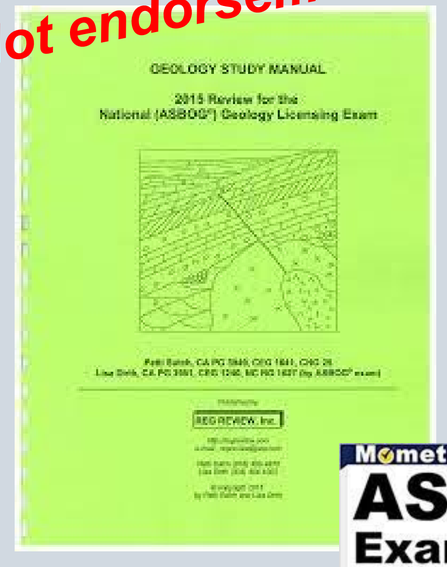
(Revised: December 2019)

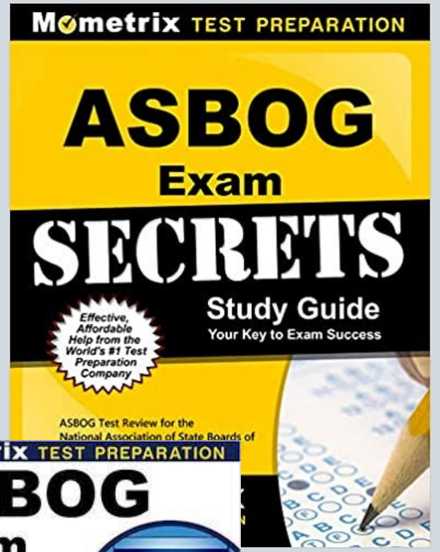
Resources

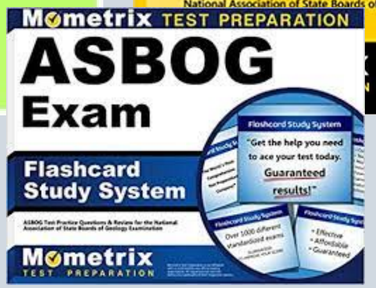
Other

- ✓ Private market, like REG Review*
- ✓ MIT open courses
- ✓ College textbooks
- ✓ Study blue flashcards
- ✓ www.asbog.org//candidatres/candidates.html

*Not endorsements







You Can Do This! PSU Alumni Prove It!

Current* OSBGE registrants who are alumni of PSU

25 GITs

55 RGs

17 CEGs

Go Vikings!

PSU has more alumni with active registrations in Oregon than UO, OSU, or WOU. PSU ROCKS!

*Data as of 3/2023

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Labor Statistics

	US Bureau of Labor	OR Employment Dept
2021 Median Salary	$83,680/year ~$40/hr	~$41/hr
Entry Level Education	Bachelor's Degree	Bachelor's Degree
# Jobs 2021	24,900	513
Job Outlook 2021-2031	5% Growth	19.5%
Employment Change 2021-2031	1,200	59 per year

How to Become a Professional Geologist: Typically need a Bachelor's degree to enter the profession. Some positions require a graduate degree. **Most geologists need a state-issued license.**

US Bureau of Labor Statistics – Occupational Outlook Handook (available online)

LARGEST SECTORS OF EMPLOYMENT FOR GEOSCIENTISTS (2021 data)

Architectural, engineering, and related services	26%
Management, scientific, and technical consulting services	19%
Mining, quarrying, and oil and gas extraction	13%
Federal government	10%
State government (excluding positions in education)	9%

Important Skills to Develop

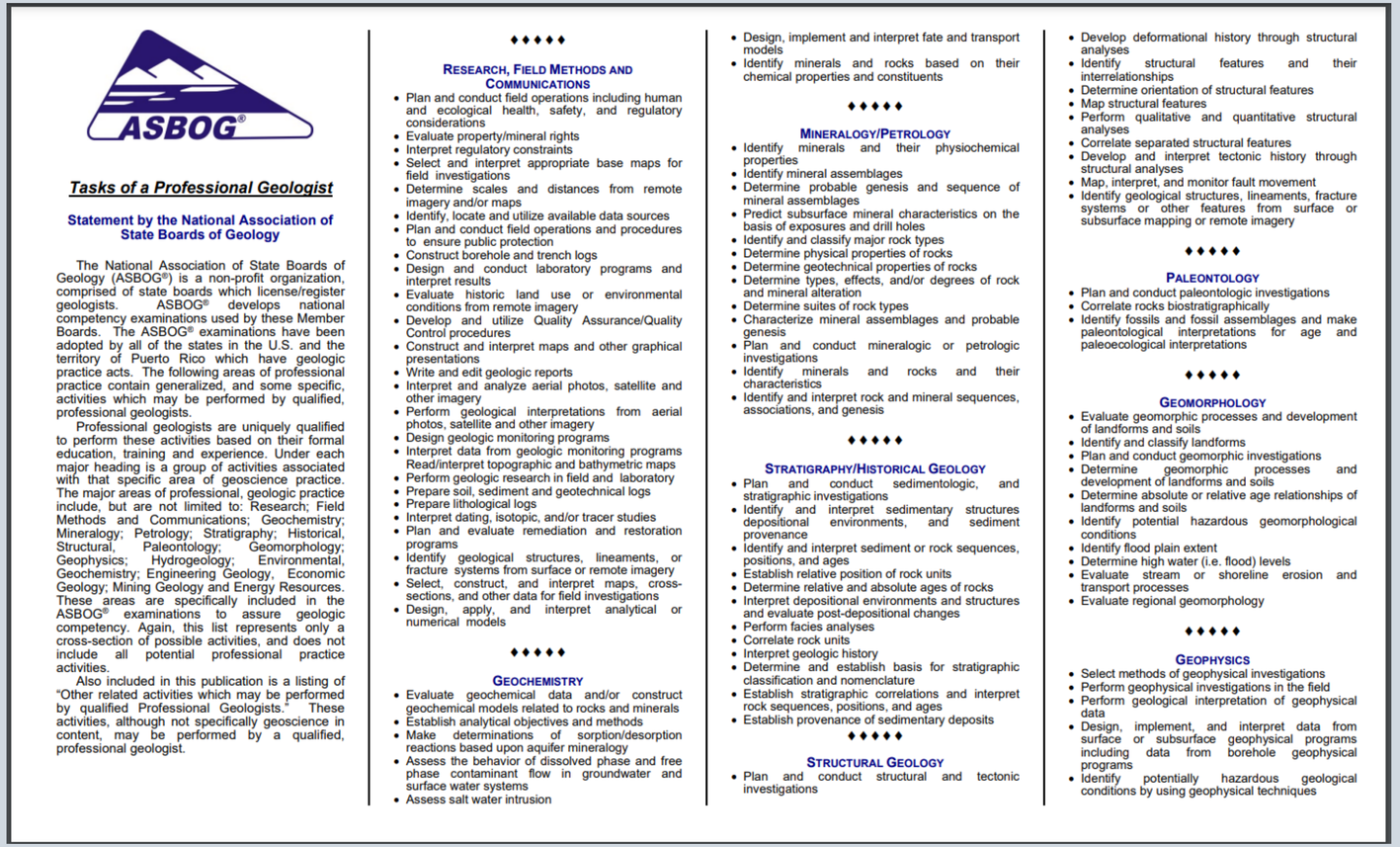
Geologic knowledge is very important but so are other skills.

- Communication skills – writing, speaking, etc.
- Critical-thinking skills.
- Complex problem-solving skills.
- Computer/math skills
- Database management skills
- Graphic design/data visualization skills
- Data science skills
- Outdoor skills/stamina may be needed for positions involving significant fieldwork (but not all positions require field work).

Tasks of a Professional Geologist

For each subject area covered in the ASBOG FG & PG, ASBOG lists tasks professional geologists are uniquely qualified to perform.

This list is not intended to define the entire scope of practice for professional geologists.



Tasks of a Professional Geologist

Statement by the National Association of State Boards of Geology

The National Association of State Boards of Geology (ASBOG®) is a non-profit organization, comprised of state boards which license/register geologists. ASBOG® develops national competency examinations used by these Member Boards. The ASBOG® examinations have been adopted by all of the states in the U.S. and the territory of Puerto Rico which have geologic practice acts. The following areas of professional practice contain generalized, and some specific, activities which may be performed by qualified, professional geologists.

Professional geologists are uniquely qualified to perform these activities based on their formal education, training and experience. Under each major heading is a group of activities associated with that specific area of geoscience practice. The major areas of professional, geologic practice include, but are not limited to: Research; Field Methods and Communications; Geochemistry; Mineralogy; Petrology; Stratigraphy; Historical, Structural, Paleontology; Geomorphology; Geophysics; Hydrogeology; Environmental, Geochemistry; Engineering Geology, Economic Geology; Mining Geology and Energy Resources. These areas are specifically included in the ASBOG® examinations to assure geologic competency. Again, this list represents only a cross-section of possible activities, and does not include all potential professional practice activities.

Also included in this publication is a listing of "Other related activities which may be performed by qualified Professional Geologists." These activities, although not specifically geoscience in content, may be performed by a qualified, professional geologist.

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RESEARCH, FIELD METHODS AND COMMUNICATIONS

- Plan and conduct field operations including human and ecological health, safety, and regulatory considerations
- Evaluate property/mineral rights
- Interpret regulatory constraints
- Select and interpret appropriate base maps for field investigations
- Determine scales and distances from remote imagery and/or maps
- Identify, locate and utilize available data sources
- Plan and conduct field operations and procedures to ensure public protection
- Construct borehole and trench logs
- Design and conduct laboratory programs and interpret results
- Evaluate historic land use or environmental conditions from remote imagery
- Develop and utilize Quality Assurance/Quality Control procedures
- Construct and interpret maps and other graphical presentations
- Write and edit geologic reports
- Interpret and analyze aerial photos, satellite and other imagery
- Perform geological interpretations from aerial photos, satellite and other imagery
- Design geologic monitoring programs
- Interpret data from geologic monitoring programs Read/interpret topographic and bathymetric maps
- Perform geologic research in field and laboratory
- Prepare soil, sediment and geotechnical logs
- Prepare lithological logs
- Interpret dating, isotopic, and/or tracer studies
- Plan and evaluate remediation and restoration programs
- Identify geological structures, lineaments, or fracture systems from surface or remote imagery
- Select, construct, and interpret maps, cross-sections, and other data for field investigations
- Design, apply, and interpret analytical or numerical models

♦♦♦♦♦

GEOCHEMISTRY

- Evaluate geochemical data and/or construct geochemical models related to rocks and minerals
- Establish analytical objectives and methods
- Make determinations of sorption/desorption reactions based upon aquifer mineralogy
- Assess the behavior of dissolved phase and free phase contaminant flow in groundwater and surface water systems
- Assess salt water intrusion
- Design, implement and interpret fate and transport models
- Identify minerals and rocks based on their chemical properties and constituents

♦♦♦♦♦

MINERALOGY/PETROLOGY

- Identify minerals and their physiochemical properties
- Identify mineral assemblages
- Determine probable genesis and sequence of mineral assemblages
- Predict subsurface mineral characteristics on the basis of exposures and drill holes
- Identify and classify major rock types
- Determine physical properties of rocks
- Determine geotechnical properties of rocks
- Determine types, effects, and/or degrees of rock and mineral alteration
- Determine suites of rock types
- Characterize mineral assemblages and probable genesis
- Plan and conduct mineralogic or petrologic investigations
- Identify minerals and rocks and their characteristics
- Identify and interpret rock and mineral sequences, associations, and genesis

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STRATIGRAPHY/HISTORICAL GEOLOGY

- Plan and conduct sedimentologic, and stratigraphic investigations
- Identify and interpret sedimentary structures depositional environments, and sediment provenance
- Identify and interpret sediment or rock sequences, positions, and ages
- Establish relative position of rock units
- Determine relative and absolute ages of rocks
- Interpret depositional environments and structures and evaluate post-depositional changes
- Perform facies analyses
- Correlate rock units
- Interpret geologic history
- Determine and establish basis for stratigraphic classification and nomenclature
- Establish stratigraphic correlations and interpret rock sequences, positions, and ages
- Establish provenance of sedimentary deposits

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STRUCTURAL GEOLOGY

- Plan and conduct structural and tectonic investigations
- Develop deformational history through structural analyses
- Identify structural features and their interrelationships
- Determine orientation of structural features
- Map structural features
- Perform qualitative and quantitative structural analyses
- Correlate separated structural features
- Develop and interpret tectonic history through structural analyses
- Map, interpret, and monitor fault movement
- Identify geological structures, lineaments, fracture systems or other features from surface or subsurface mapping or remote imagery

♦♦♦♦♦

PALEONTOLOGY

- Plan and conduct paleontologic investigations
- Correlate rocks biostratigraphically
- Identify fossils and fossil assemblages and make paleontological interpretations for age and paleoecological interpretations

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GEOMORPHOLOGY

- Evaluate geomorphic processes and development of landforms and soils
- Identify and classify landforms
- Plan and conduct geomorphic investigations
- Determine geomorphic processes and development of landforms and soils
- Determine absolute or relative age relationships of landforms and soils
- Identify potential hazardous geomorphological conditions
- Identify flood plain extent
- Determine high water (i.e. flood) levels
- Evaluate stream or shoreline erosion and transport processes
- Evaluate regional geomorphology

♦♦♦♦♦

GEOPHYSICS

- Select methods of geophysical investigations
- Perform geophysical investigations in the field
- Perform geological interpretation of geophysical data
- Design, implement, and interpret data from surface or subsurface geophysical programs including data from borehole geophysical programs
- Identify potentially hazardous geological conditions by using geophysical techniques

Some Career Resources

Geoscience Resources on Opportunities in the Workforce
- https://www.grow-geocareers.com/

Association of Environmental and Engineering Geologists (AEG)
- https://www.aegweb.org/students

American Geosciences Institute (AGI)
- https://www.americangeosciences.org/workforce/career-resources

Geological Society of America (GSA)
- https://www.geosociety.org/GSA/Education_Careers/GeoCareers/GSA/careers/home.aspx

American Institute of Professional Geologists (AIPG)
- https://aipg.org/page/CareerCenter

Your own university! Talk with the head of your degree program and your counselors. Attend career fairs and other events that expose you to alumni, employers, etc.

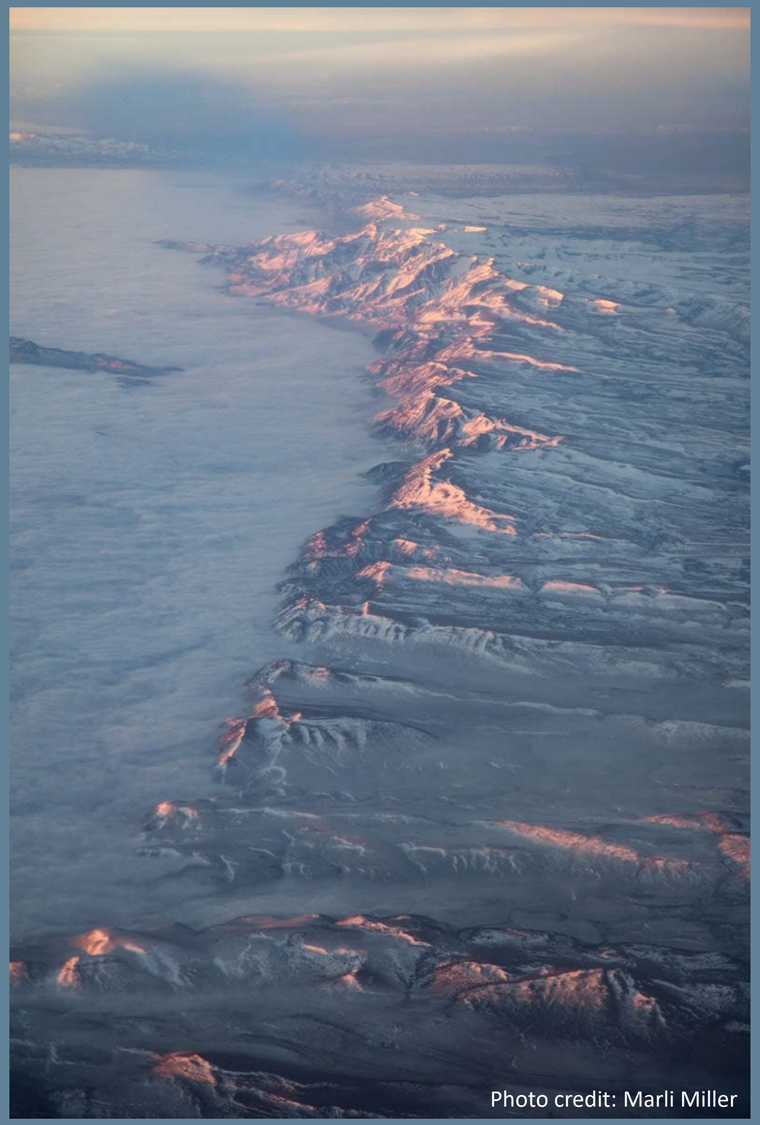

Photo credit: Marli Miller

visit: www.oregon.gov/osbge

call: 503.566.2837

e-mail: osbge.info@bgelab.oregon.gov

Visit also: asbog.org

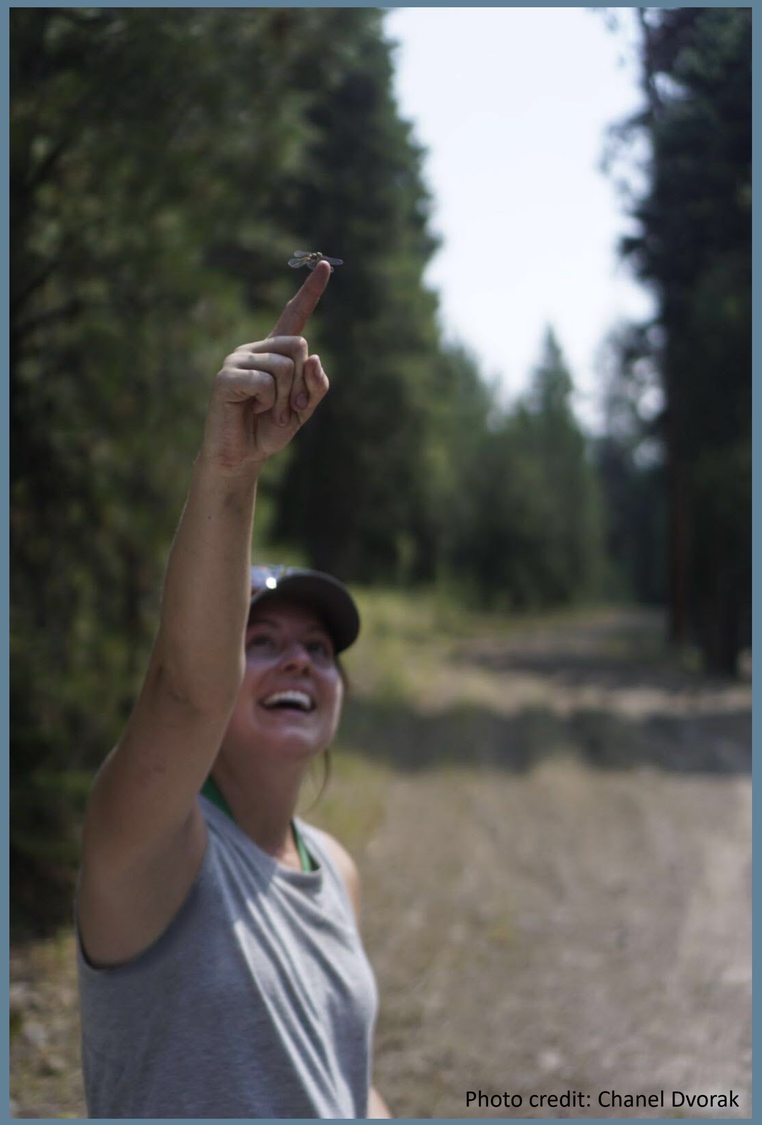

Photo credit: Chanel Dvorak

Questions?