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## Resume for Frank D. Granshaw

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### Educational Experience

*Geology* (BS, MS) - Portland State University , Portland, OR.  
*Science Education/ Earth Science* (MAT) - Lewis and Clark College, Portland, OR.  
*Physics and Psychology* (BA) - Linfield College, McMinnville, OR.

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### Summary of Skills

- *Teaching* - Taught undergraduate geology, oceanography, meteorology, astronomy, and physics. Taught graduate science education courses and workshops. Tutored undergraduate physics and chemistry. Taught earth, physical, and computer science courses for elementary and secondary school students.
- *Curriculum/Exhibit Development* - Designed software, curriculum, laboratory equipment, and demonstration apparatus for earth, physical, and environmental science.
- *Project Planning and Management* - Currently own and operate an earth science curriculum and scientific visualization company. Secured and managed earth science education grants. Served on several educational committees at Portland Community College. Managed the development of physics related exhibit areas (exhibit development, grant writing, and budget management). Managed the operation of mobile computer education programs (curriculum design, staffing, and equipment maintenance). Supervised the operation of nonprofit recycling center and programs for residential care facilities.
- *Technical* - Produced educational software, programs for geophysical surveys, and chemical and architectural inventory systems using MacOS, Windows, MS-DOS, and Prodos based microcomputers. Researched glacier spatial change in the North Cascades Range of northwestern Washington, changes in the location of the terminus of Elliot Glacier (Mt. Hood, OR.), Slope stability of the Overlook Drive community (Vancouver, WA.), faulting in the Tualatin Basin (Northwestern Oregon), the geochemistry of Columbia River Basalts in the Tualatin mountains (Northwestern Oregon), the stratigraphy of estuary deposits of the central Oregon coast, faulting in the central Willamette Valley (western Oregon), and the stratigraphy of late Tertiary sedimentary rock on the southern Oregon coast. Majors tools used in these research projects included vector and raster based geographic information systems, magnetic, seismic, and gravimetric survey equipment, electronic total station, geographic information system software, gps and dgps receivers, and gamma ray spectroscope for neutron activation analysis. Constructed laboratory apparatus and exhibit prototypes using a variety of machine shop equipment.

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### Teaching and Curriculum Development Experience

- 1993- present - *Sole Proprietor* - Artemis Science (Portland, Or)
- 1990- present - *Geology, Earth Science, and Physics Instructor* - Portland Community College (Portland, Or), Clark Community College (Vancouver, WA), University of Portland (Portland, Or), George Fox (Newberg, Or)
- 1983-present - *Exhibit and Educational Program Designer; Physics Specialist; Energy Education Specialist* - Oregon Museum of Science and Industry (Portland, OR.)
- 2001-2002 - Research Assistant - Portland State University - (Portland, OR.)
- 1990-91 - *Physics/chemistry Tutor and Lab Assistant* - Mt. Hood Community College (Gresham, OR.)
- 1980-82 - *Mobile Computer Education Program Coordinator* - Lawrence Hall of Science (Berkeley, CA.)

## **Community and Professional Activities**

- Faculty fellow (*Instructional technology consultant*) for the science-health division (Sylvania campus of Portland Community College).
- *Member* and former *chair person* of physical science / geology subject area curriculum committee (Portland Community College).
- *Member* of habitat restoration committee (Sylvania campus of Portland Community College).
- *Science consultant* for automotive curriculum team (Sylvania campus of Portland Community College).
- *Event judge* - Northwest Science Expo
- *Participant* in a two-week workshop in volcanic landscapes of the Pacific Northwest (Portland State University -1994)
- *Participant* in the community college section of the Summer Outreach in Science (University of Oregon -1995)
- *Coordination committee member* for National Association of GeoScience Teachers, Northwest regional conference (Portland Community College - 2000)

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## **Professional Affiliations**

American Geophysical Union, Geological Society of America, National Association of Geology Teachers, Sigma Xi Research Society.

## **Research Publications and Presentations**

- *Glacier Change in the North Cascades National Park Complex, Washington USA - 1958-1998* - Thesis approved for publication by Portland State University in April 2002.  
<<http://www.geol.pdx.edu/GlaciERS/granshaw/thesis.html>>
- *Glacier Change in the North Cascades National Park Complex, Washington USA - 1958-1998* - Presentation given at the North Cascades Glacier conference, Sedro Wooley, WA. 2001.
- *Index Glaciers and Regional Glacier Change* - Presentation given at the Northwest Glaciology conference, Seattle WA., 2001
- *Mapping Glacier Change in the North Cascades National Park, 1958-1998, A progress report* - Presentation given at the Northwest Glaciology conference, Portland OR., 2000
- *Spatial Change of the Glaciers of North Cascade National Park, 1950s / 1960s to 1998* - Presentation given at Northwest Glaciology conference, Vancouver BC, 1999
- *Using Remote Sensing and Geographic Information Systems to Determine Spatial / Temporal Variations in the Glaciers of the North Cascades Region of Washington, USA* - Presentation given at western regional Geological Society of America meeting, Berkley CA., 1999

## **Educational Publications and Presentations**

- *Resource Manual for Earth Science* - Earth science text and lab manual developed for teaching college introductory earth science (In development).
- *Resource Manual for Geology of the Pacific Northwest* - Text developed for teaching college level regional geology (In development).
- *Astronomical Observation Kit* - Lab manual and tool kit designed for teaching introductory college astronomy - Published in 1999.
- *Energy education workshop manuals* - Coauthored for OMSI teacher workshops.
- *Using Multimedia in the Earth Science Classroom* - Presentation given at western regional Geological Society of America Meeting, Portland OR, 1996
- *Using Multimedia and Geographic Information Systems in Undergraduate Earth Science Education* - Presentation given at western regional Geological Society of America meeting, Berkley CA., 1999

## Software and Web-based Publications

- *Glacier Change in the Upper Skagit River Basin* - An educational web site developed for the geology department at Portland State University with support from Skagit Environmental Endowment Commission <<http://www.geol.pdx.edu/Glaciars/Skagit>>.
- *Tour of the McMurdo Dry Valleys, Antarctica* - A virtual tour of the Dry Valleys near McMurdo Sound in Antarctica. Developed as an educational component for glacier climate research being done in the Dry Valleys <<http://www.geol.pdx.edu/Glaciars/McMurdoVT/index.html>>
- *Star Probe* - Introductory stellar physics and evolution - Educational software published in 1993. <<http://www.artemis-science.com/StarProbe.html>>
- *Digital Atlas* - An on-line geophysical atlas developed for introductory college and high school earth science courses. This site is password protected. Access information available upon request. <<http://www.artemis-science/Atlas>>.
- *Environmental atlas of the Portland Community College Sylvania Campus* - A Geographic Information System database constructed for use in instruction and environmental management.
- *PCC Earth Science Web Resource Page* - A web page designed to give students access to significant web resources related to earth science. This page also serves as an electronic bulletin board for courses that I teach at PCC. <<http://spot.pcc.edu/~fgransha/eslinks>>
- *Sundwelling* - Passive solar home simulator - Educational software published 1986 through Oregon Museum of Science and Industry.
- *Glaciars and Glacier Change of Mt. Rainier National Park* - An educational web site developed for the U.S. National Park Service at Mt. Rainier National Park, Washington (In development).
- *GeoCycle* - A geologic cycle simulator developed for use in introductory geology courses (in development).
- *Digital Field Journal of the Pacific Northwest* - An interactive map / photo collection of personal fieldwork done in Oregon and Washington - Educational software in development
- Presentation and animation packages for meteorology, oceanography, and geology in development for teaching college general science and geology courses (in development).

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## Summary of Undergraduate and Graduate Courses Taught

- *Volcanoes* (G208 - Portland Community College - Portland OR.) - A one quarter introduction to volcanic processes. Topics included igneous processes and materials, volcanic structures, geothermal technology, and volcanic hazard assessment. <<http://spot.pcc.edu/~fgransha/G208>>
- *Geology of the Pacific Northwest* (G207 - Portland Community College - Portland, OR) - A one quarter introduction to the geology of the Pacific Northwest. Topics included basic geologic concepts, the geography and geology of major physiographic regions, and the geologic history of the region. <<http://spot.pcc.edu/~fgransha/G207>>
- *Physical Geology* (GS201- Portland Community College - Portland, OR) - First of a three term sequence in introductory geology. Topics included basic geologic processes, mineralogy, and petrology.
- *Physical Science: Geology* (GS106 - Portland Community College - Portland, OR) - A one term introduction to geology designed for non-science majors. Topics included geologic materials (minerals, rocks, and soils), geomorphic processes, structural geology, historical geology, and related environmental issues.
- *Physical Science: Astronomy* (GS107 - Portland Community College - Portland, OR) - A one term introduction to astronomy designed for non-science majors. Topics included basic observing techniques, history of astronomy, and planetary and stellar astronomy.
- *Physical Science: Oceanography* (GS108 - Portland Community College - Portland, OR) - A one term introduction to oceanography designed for non-science majors. Topics included marine geography and geology; chemistry of sea water; physics of waves, tides, and currents; marine biology; and related environmental issues. <<http://spot.pcc.edu/~fgransha/GS108>>
- *Physical Science: Meteorology* (GS109 - Portland Community College - Portland, OR) - A one term introduction to meteorology designed for non-science majors. Topics included basic atmospheric chemistry and physics, weather forecasting and modification, climatology, and related environmental issues. <<http://spot.pcc.edu/~fgransha/GS109>>

- *Problems in Earth Science* (SCI383 - University of Portland - Portland, OR) - One semester introduction to geology for engineers and science education majors. Topics included geologic materials (minerals, rocks, and soils), geomorphic processes, structural geology, geophysics, historical geology, and related engineering/ environmental issues.
- *Essentials of Earth Science* (GSC120 - George Fox College - Newberg, OR) - A fifteen week survey of geology, meteorology, and astronomy designed for non-science majors. Topics included observational, planetary, and stellar astronomy, weather and climate, basic mineralogy / petrology, geologic processes and time.
- *Introduction to Physics* (Phy105 - Clark College - Vancouver, WA.) - An eight week introduction to physics. Topics included kinematics, dynamics, simple machines, fluids, and heat.
- *Teaching Earth Science in the Pacific Northwest* (CI510 - Portland State University - Portland, OR,) A two weekend introduction to the geology of the Pacific Northwest designed for teachers (elementary and secondary levels). Topics included general geologic concepts; the geography, geology, and geologic history of the Pacific Northwest, and instructional strategies related to these topics.
- *Content Update in Science: Energy Studies* - (SCI598- Lewis & Clark College; CI510 - Portland State University - Portland, OR.) - A one term energy studies course designed for practicing teachers (elementary and secondary level). Topics included physical principles of energy, patterns of human energy consumption/ production, energy planning, and instructional strategies related to these topics.
- *Teacher Workshops* - (Oregon Museum of Science and Industry - Portland, OR; Lawrence Hall of Science - Berkeley, CA.) - Short-term workshops in energy production, conservation, computer literacy, programming, and educational strategies related to these topics.

### **Summary of Relevant Academic Work**

*Earth Science / Geology* - Mineralogy; Igneous Petrology; Metamorphic Petrology; Sedimentary Petrology; Paleontology; Stratigraphy; Structural Geology; Field Geology; Field Camp; Geophysics; Field Geophysics; Geochemistry; Advanced Geochemistry; Groundwater Geology; Groundwater Modeling; Environmental Geology; Engineering Geology; Advanced Engineering Geology; Seismic Site Evaluation; Remote Sensing; Geographic Information Systems; Hydroclimatology; Glacial Geomorphology; Geology of the Oregon Country; Volcanic Processes of the Pacific Northwest; Pacific Northwest Climates; Bibliographic Resources in Geology; Independent studies in science education and geomorphology, physical geology, structural geology, regional geology, and mineralogy and petrology.

*Physics* - Chemistry/Physics; Intermediate Physics; Modern Physics; Electricity and Magnetism; Digital Electronics; Technical Glass working

*Chemistry* - Chemistry/Physics; Qualitative Analysis; Quantitative Analysis; Organic Chemistry

*Environmental Science and Biology* - Environmental Biology; Bioecology; Biology Seminar; Solar Design; Solar Design Workshop; Wind Power Systems

*Mathematics* - Calculus; Modern and Linear Algebra; FORTRAN and Statistical Analysis

*Education* - Verbal/Visual Literacy; Educational Research; Evaluating the Outcomes of Teachings; Student Development and Learning; QED Seminar; Education & Society; Teaching Practicum; Science and Technology Education (Strategies); Science and Technology Education (Philosophy); Classroom Management; Content Update: Earth Science; Social and Cultural Foundations of Education; Science Museum Education; Environmental Education; Energy Education; Energy Education in the Classroom; Summer Outreach in Science