

## APPLICATION

To insure consideration, early application is encouraged. Applications should include information on outdoor experience and adaptability to rugged field conditions; transcripts, evidence of school or university status; and letters of recommendation from a supervisory head and two other individuals regarding scholarship, character and compatibility.

Make Application to:

**Glaciological and Arctic Sciences Institute**

**Dr. Maynard M. Miller, Dean**

**College of Mines & Earth Resources (ph. 208-885-6195)**

**University of Idaho, Moscow, Idaho 83843**

OR

**Foundation for Glacier and Environmental Research**

**514 E. 1st St., Moscow, ID. 83843 (ph. 208-882-1237)**

## STAFF AND RESOURCE SCIENTISTS

DR. MAYNARD M. MILLER, Dean, College of Mines and Earth Resources and Professor, Geology Dept., Director, Glaciological and Arctic Sciences Institute, University of Idaho (applied geomorphology, glaciology, Quaternary stratigraphy, mining geology).

DR. ROBERT F. BLACK, Department of Geology, University of Connecticut, Storrs, CT (permafrost, glacial and Pleistocene geology).

DR. JAMES H. ANDERSON, Institute of Arctic Biology, University of Alaska, Fairbanks, AK (geobotany, palynology, dendroglaciology).

ROBERT A. ASHER, Foundation for Glacier and Environmental Research, Seattle, WA (Deputy Field Leader, glaciology, data processing, glacier surveying).

CALVIN E. ANDERSON, Foundation for Glacier and Environmental Research, Seattle, WA. Formerly research meteorologist, National Weather Service, Washington, D.C. (climatology, meteorology).

DR. RICHARD L. CARLSON, Geophysics Dept., Texas A and M University, College Station, TX (tectonophysics, glacier geophysics).

DR. DAVIS A. FAHLQUIST, Dept. of Geophysics and Assoc. Dean, College of Geosciences, Texas A and M University, College Station, TX (exploration geophysics).

AUSTIN E. HELMERS, Foundation for Glacier and Environmental Research, Juneau, AK. Formerly Senior Scientist, U.S. Forest Service, Tongass National Forest, Juneau, AK (glacier and forest hydrology, mass balance).

DR. VERNON JONES, Department of Atmospheric Sciences, University of Missouri, Columbia, MO (meteorology and glacio-climatology).

DR. RICHARD A. MARSTON, Department of Geological Sciences, University of Texas, El Paso, TX (physical geography, glacier hydrology, water resources, remote sensing).

DR. ALFRED PINCHAK (Ph.D. and M.D.) Department of Fluid Mechanics, Case Western Reserve University Cleveland, OH (continuum mechanics, glacio-hydrology, medicine).

BARRY W. PRATHER, Foundation for Glacier and Environmental Research, Seattle, WA (geophysics, seismology, expedition techniques, field methods).

DR. CHARLES ROSENFELD, Geography Department, Oregon State University, Corvallis, OR (remote sensing, arctic-alpine terrain analysis).

DR. HEINZ RUTHER, Department of Surveying, University of Cape Town, South Africa (engineering and environmental surveying, terrestrial photogrammetry, cartography).

DR. DOUGLAS N. SWANSTON, U.S. Forest Service, Forestry Sciences Lab., Juneau, AK (mass wastage, landslide mechanics, engineering geology).

DR. AYLMEYER H. THOMPSON, Meteorology Department, Texas A and M University, College Station, TX (arctic climatology, synoptic meteorology, mountain wind research).

DR. WALTER WELSCH, University of the Federal Armed Forces, Munich, Germany (geodesy, surveying, photogrammetry, field methods).

DR. GEORGE A. WILLIAMS, Professor, Geology Department, and Director, Mining and Minerals Resources Research Institute, University of Idaho, Moscow, ID (geological mapping, economic geology, mineral exploration).

DR. CHARLES WILSON, Geophysical Institute, University of Alaska, College, AK (atmospheric geophysics, glaciology, polar research).

JOAN W. MILLER, Foundation for Glacier and Environmental Research, Moscow, ID (Administrative Director, logistics, planning, personnel and fiscal management).

### Medical, Safety and Terrain/Survival Instruction:

W.M. Smith, M.D. and T.R. Haley, M.D., Foundation for Glacier and Environmental Research, Coordinators; T. Croley, M.D.; R. Schutt, M.D.; Chas. J. Sternhagen, M.D.; W. Davidson, J. Kleinman, M. Pelto, L.D. Miller, M. Miller, B. Prather, D. Thomas.

### Administration, Liaison and Logistics:

Joan W. Miller, Sandra and Duncan Newell, Mary Ann Parke, Linda Marston, Ross Miller, Robin S. Miller, Chris Thomas, L. Thomas, Harry Swanke, Dean and Edna Williams, Ken Loken, R. Garner, I. Spring, P. Spring, B. Thoma, N. Vig, W. Zeman.

### Camp and Field Operations

R.A. Asher, Jack Lamb, Jon Surgenor, John Shield, Ed Chacho, Tom Ferrara, Eric Wetlaufer, Donald Thomas, Andy Becker, Gordon Binkhorst, Jean Dibble, Josh Hyman, Glen Liston, Brad Meiklejohn, Don McCully, J. O'Callaghan, L. Sliva; Gary, John and Larry Thoma, C. Dillon, Mike Knoll, D. Lubin, L. Schoen.

### Other Lecturers, Advisors and Research Associates:

Dr. Talbert Abrams, Abrams Aerial Survey Corp., Lansing, MI; Dr. David Brew, and Dr. Arthur Ford, Alaska Branch, U.S. Geological Survey, Menlo Park, CA; Ed Chacho, U.S. Army Corps of Engineers, CRREL, Fairbanks, AK; Dr. B. Colman, Dept. of Meteorology, Mass. Inst. of Tech., Cambridge, Mass.; Dr. A. Chrzanoski, Div. of Survey Engineering, University of New Brunswick, Fredricton, N.B., Canada; Dr. H.C. Curl, NOAA, Pacific Marine Environmental Lab., Seattle, WA; Dr. Ben Everitt, Office of Water Resources, State of Utah, Salt Lake City; Ray C. Garner, Idyllwild Center, University of So. Calif.; Dr. Terry Howard, Dept. of Geol., University of Idaho; Dr. Jack H. Helge, Nat. Marine Fisheries Lab., Auke Bay, Ak; Dr. R.W. Little, Head, Dept. of Bio-Engineering, and Dr. G. Cloud, Dept. of Mech. Engineering, Michigan State University, E. Lansing, MI; Dee Molenaar, Found. for Glacier Research, Seattle, WA; Dr. B. Molnia, Pacific-Arctic Branch of Marine Geology, U.S.G.S., Menlo Park, CA; Dr. Heinz Slupetzky, Geographical Inst., Univ. of Salzburg, Austria; Ira Spring, Field Photography, Seattle, WA; Dr. Ann M. Tallman, Atomics International Div., Rockwell-Hanford Ops., Richland, WA; Dr. Colin Thorn, Geography Dept., Univ. of Illinois, Champagne-Urbana, IL; Dr. Chas. A. Waag, Geology Dept. Boise State Univ., Boise, ID; Jim Wallis, Mining Engineer, Atlin, B.C., Canada; Dr. David F. Woolnough, Head, Survey Dept., Nova Scotia Land Survey Inst., Lawrencetown, N.S., Canada.



University of Idaho  
Glaciological & Arctic Sciences Institute  
College of Mines & Earth Resources  
Moscow, Idaho 83843

# EXPEDITIONARY FIELD TRAINING, RESEARCH PARTICIPATION AND SEMESTER CREDITS IN ARCTIC AND MOUNTAIN SCIENCES

24th Summer Institute of  
Glaciological and Arctic Sciences

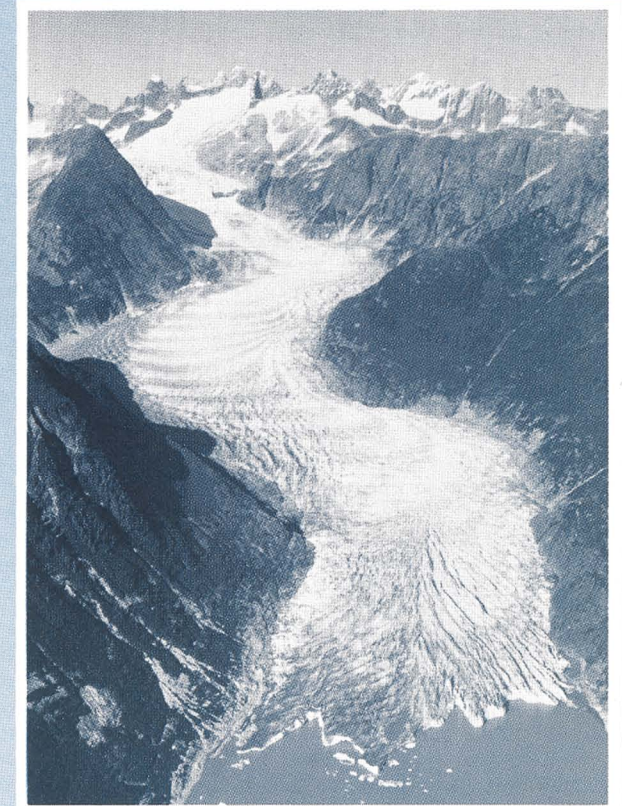
July 1 - August 24th, 1983  
Juneau Icefield, Alaska  
and the Atlin Lake Region,  
B.C. - Yukon, Canada

The University of Idaho, the Foundation for  
Glacier and Environmental Research and the  
Juneau Icefield Research Program (JIRP)



Aerial view of part of Taku Range, near Camp 16, Juneau Icefield, Alaska-Canada Coast Mountains.

U.S. Forest Service Photo



East Twin Glacier, Juneau Icefield, showing ogive  
structures, berms, Little Ice Age trim-line and scour zone

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Field trip on the lower Llewellyn Glacier.

## PURPOSE

The Juneau Icefield Research Program (JIRP) was organized in 1946 to pursue long-term research on inter-relationships of scientific disciplines necessary to understand the total environment of arctic and mountain regions. The Summer Institute of Glaciological and Arctic Sciences was organized in 1959 to provide combined academic and field training, both at the graduate and undergraduate level, so essential to the solution of these multi-varied problems. The aim is total systems competence in potential polar and mountain scientists and practical field training for geologists, hydrologists, geophysicists, atmospheric scientists, resource planners, ecologists and surveyors.

Students have the opportunity to observe and study sub-aerial processes in a dynamic region of existing glaciers and rugged mountain terrain, and to appreciate the inter-science investigational approach in the field studies applicable not only to pristine wilderness regions but to scientific assessments of environmental problems even in rural and urban areas.

Participants attend lectures at pertinent field sites, participate in demonstrations with instruments and materials in the field, and take and record scientific measurements under supervision or via their own scientific competence as part of long-range research from high-elevation and continental periglacial areas to low-level temperate and maritime regions. A realistic understanding is gained of glacio-climatological, glacio-geological and glacio-ecological relationships in natural systems. In addition, the Institute provides practical field experience in a variety of personally challenging projects.

## DATE

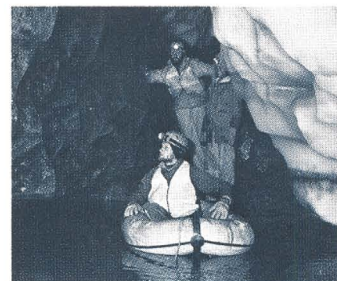
The Institute will be held from July 1 to August 24, 1983. For qualified students interested in participation in JIRP and allied regional research projects, or for those desiring field work on these problems, a period of additional field work may be arranged.

## THE PROGRAM

*"Nature without learning is a blind thing — and learning without Nature is an imperfect thing."*

—Plutarch

Emphasis is placed on expeditionary experience and where possible research participation in scientific projects developed for student involvement. Courses are offered in field geology, glaciology, geomorphology, surveying and selected environmental sciences. These are directed by Dr. M.M. Miller with visiting scientists assisting and available for consultation.



Sub-glacial cave exploration and mapping, Lemon Glacier.



Totalizing precipitation gauge, Camp 17.



Seismic depth profiling in Camp 9 sector, August 1982.



Technical discussion at Camp 10, summer 1982.

Up to 12 academic credits can be arranged through the Geology and Geography Departments of the University of Idaho.

Special topics considered are: Arctic Environmental Sciences; Terrestrial and Glacial Photogrammetry; Glacier Surveys and Mapping; Glacio-ecology; Lichenometry; Periglacial Geomorphology and Pleistocene Stratigraphy; Continuum Mechanics; Glacio-meteorology; Mountain Climatology; Glacio-hydrology; Exploration and Glacier Geophysics; Mineral Resources Prospecting; and Bedrock Geological Mapping.

All offerings are designed to take full advantage of a classical glacial, periglacial and mountain and arctic environment in terms of field and "laboratory" instruction.

Lectures, field studies and problem sessions are held on adjunct topics. All offerings are concurrent during a concentrated, five week session on the Juneau Icefield, emphasizing Neoglacial conditions. Participants in the general courses are exposed to all offerings. An initial week is devoted to indoctrination in field methods, and safety and survival techniques. Two to five weeks may be used for work on a field problem, dependent on participant's aim, interest and abilities. The last week can be concentrated in the Atlin area where deglaciated terrain provides opportunities for study of Cordilleran Wisconsinan chronology and Holocene periglacial environments. For those wishing to ally the instructional program with a specific thesis project, or equivalent independent studies, including post-doctoral research, field problems may be developed.

## PARTICIPANTSHIPS AND AWARDS

Participantships and field scholarships are available. These include awards for undergraduates (URP category) and graduate level scholarships supported by the University of Idaho, the Foundation for Glacier and Environmental Research, SOHIO Oil Company and the Explorers Club field science training fund. Scholarships and contributions are also available for high school juniors and seniors (SSTP category) via the Foundation, the Academy of Applied Science and the U.S. Army Research Office Research in Engineering Apprenticeship Program (REAP). Research assistantships in ongoing programs are offered to outstanding previous participants or others with equivalent experience.

Places for additional participants in each category are available at the field fee of \$1850 for the 8 week session. All participants cover travel expenses between their home and Juneau, Alaska, and Atlin, B.C., via Whitehorse, Y.T., back home.

## LOCATION

The main glacier area lies on or near the Juneau Icefield in the Tongass National Forest and the Atlin Wilderness Park of the Alaska-Canada Boundary Range between Juneau, Alaska and Atlin, B.C. Special emphasis is given to the Lemon glacier sector on the southern periphery and to the Cathedral Massif in the Atlin District adjacent to the icefield on the north. Here arrays of Wisconsinan deglaciation features and periglacial phenomena are observed. A permanent headquarters station is maintained at Atlin, B.C., from which field trips are also made.

## FACILITIES AND LOGISTICS

Thirteen main stations and 17 lesser camp and research facilities are located in the field. Permanent aluminum-sheathed and well-insulated wooden buildings exist at some field sites. Temporary shelters and tents are used at trail camps. A 3500-volume library containing pertinent research materials, maps, aerial photos and other basic references is maintained at five main field stations, as well as in the geosciences research library at the Atlin base station. A wide range of field and laboratory equipment for geophysical, glaciological, surveying, photogrammetric, botanical, meteorological, and geological work is available for teaching and research.

Communication between camps and with the Juneau and Atlin bases is handled by radio. Helicopters, charter aircraft, and ski-planes are used for transportation, with ground transport carried out via foot travel, skis, oversnow vehicles and sometimes a dog team.

Permanent installations are provided by the **Foundation for Glacier and Environmental Research, Pacific Science Center, 200-2nd Ave. N., Seattle, Washington, 98109.** The summer field address is **F.G.E.R., P.O. Box 775, Juneau, AK., 99801.**

## ELIGIBILITY

Graduate and undergraduate participants must be enrolled in, or officially admitted for, work as candidates for a degree at their respective institutions. A high academic record or potential is expected. Considerable weight is placed on personal character, demonstrated interest and professional motivation. Several post-doctoral and senior scientist participantships are available. A few high ability high school students with university plans can also be included. Experience in mountain and outdoor living is given emphasis in the selection process.

In the operation of this program and in selecting individuals for participation, the University of Idaho and the Foundation for Glacier and Environmental Research will not discriminate against any person on the ground of race, creed, color, sex, or national origin.



Oversnow vehicles in Icy Basin on upper Taku Glacier.