

## 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, your academic plan, 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, Director (208-885-6192 or 885-6382)

University of Idaho, Moscow, Idaho 83843

and University of Alaska Southeast, Juneau, AK 99801

or

Foundation for Glacier and Environmental Research

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

## STAFF AND RESOURCE SCIENTISTS

DR. MAYNARD M. MILLER, Professor of Geology; Director, Glaciological and Arctic Sciences Institute, University of Idaho (field institute director, geomorphology, glaciology, Quaternary geology, economic geology, NSF-REU projects).

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

DR. JAMES E. BUGH, Dept. of Geology, NY State University College, Cortland, NY (geomorphology, glacio-hydrology, mass balance, senior NSF-REU mentor).

DR. BARRY C. BISHOP, Chairman, Committee for Research & Exploration, National Geographic Society, Washington, D.C. (physical geography, field exploration).

DR. RICHARD L. CARLSON, Department of Geophysics, Texas A & M University, College Station, TX (glacier geophysics, seismology, tectonophysics).

ALBERT CLOUGH, State of Alaska, Dept. of Commerce & Economic Development, Juneau, AK (mineral exploration, environmental geology, project management).

DR. BRADLEY COLMAN, Research Meteorologist, NOAA, Environmental Research Laboratory, Seattle, WA (atmospheric sciences, glacio-climatology, REU mentor).

DR. P. JAY FLEISHER, Dept. of Geology, NY State University College, Oneonta, NY (applied geomorphology, glacial geology, FGER Science Teacher Project).

DR. ROBERT B. FORBES, Past Director, Alaska Div. of Geological and Geophysical Surveys (geology, metamorphics, vulcanology, geol. projects director, mentor).

DR. ARTHUR GITTINS, Dept. of Entomology, University of Idaho (research methods, arctic entomology, environmental science, senior faculty mentor).

ROBERT HAMMOND, Geophysical Institute, University of Alaska, Fairbanks; Research Associate, Glaciological Institute, University of Idaho (ice radar).

DR. CHRISTIAN HEIPKE, Institute of Photogrammetry, Technical University, Munich, Germany (geodesy, photogrammetry, GPS, REU mentor).



Research team on a high plateau of the Juneau Icefield, Alaska-Canada, during August. (all photos FGER).

PETER L. KRESAN, Dept. of Geol. Sciences, University of Arizona, Tucson, AZ (field geology, environmental geology, NSF-REU & YSP programs director).

ING, MARTIN LANG, Surveying Engineering Dept., Federal University of the Armed Forces, Neubiberg, Germany (glacier and field surveying, EDM, GPS, mentor).

DR. MELVIN G. MARCUS, Department of Geography, Arizona State University, Tempe, AZ (arctic geomorphology, glaciology, glacio-climatology, mentor).

LANCE D. MILLER, Foundation for Glacier & Environmental Research and Echo Bay Mines, Juneau, AK (geology, structure, mineral deposits, field methods).

DR. KEITH MOUNTAIN, Glaciological Institute, University of Idaho (physical geography, radiation models, NSF-YSP projects; JIRP student mentors coordinator).

JACK G. PETERSON, Asst. to the Director, Environmental Affairs, U.S. Dept. of Interior, Bur. of Land Management (resource economics, science & public issues).

DR. ALFRED PINCHAK (Ph.D.; M.D.), Dept. of Mechanical Science, Case Western Reserve Univ., Cleveland, OH (glacio-hydrology, stress analysis, field statistics).

DR. KENNETH F. SPRENKE, Department of Geology and Geological Engineering, University of Idaho (geophysics, seismology, gravimetry, field methods).

GRETCHEN STAEBELI, Found. for Glacier & Environ. Research, Seattle, WA (safety & terrain training; ski & mountaineering instruction, junior staff coordinator).

DR. DAVID STOCK, College of Engineering, Washington State University, Pullman, WA (continuum mechanics, ice deformation projects, NSF-REU mentor).

DR. GEORGE A. WILLIAMS, Professor of Geology, Research Associate, Glaciological Institute, University of Idaho (geologic mapping, senior YSP-REAP mentor).

JOAN W. MILLER, Advising Administrative Officer, Foundation for Glacier and Environmental Research, Moscow, ID (logistics, plans, personnel and fiscal mgt.).

### Field Advisers and Adjunct Staff:

DR. KEITHECHELMMEYER, Geophysical Institute, University of Alaska, Fairbanks, AK (glaciology, laser surveys). DR. CALVIN J. HEUSSER, Professor of Botany, Herbarium, New York University, Tuxedo Park, NY (palynology, paleoclimatic research). ANDREW J. KAUFFMAN, American Alpine Club. JACK LAMB, Research Associate, FGER (C-29 mass balance project). GREGG LAMOREY, Geology Dept., University of Nevada, Reno, (Glacier Chemistry Project, NSF Young Scholars Staff Adviser). DONALD McCULLY, FGER (plans, facilities & mechanics). SCOTT MCGEE, FGER (surveying & logistics). GARY MENDIVIL, Found. for Glacier and Environ. Research, Juneau, AK (safety and terrain instruction, field logistics). DR. BRUCE MOLNIA, Chief, International Polar Programs, U.S. Geological Survey, Washington, D.C. DR. MAURI PELTO, Research Associate, FGER, Seattle, WA (FGER Cascades and Olympics glacier project). WILLIAM L. PUTNAM, Lowell Observatory, Flagstaff, AZ. DR. ALAN ROHAY, Geophysicist, Battelle NW Labs, Richland, WA. DR. VIRGINIA ROHAY, Senior Geologist, Westinghouse-Hanford, Richland, WA. DR. DOUGLAS N. SWANSTON, Principal Geologist, Tongass National Forest, Forestry Sciences Lab, U.S. Forest Service, Juneau, AK (engineering geology). ANDY YOUNG, Foundation for Glacier Research, maintenance & mechanics.

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

Terry Carr, M.D., Bill Cox, M.D., J. Davidson, M.D., G. Miller, M.D., A.C. Pinchak, M.D., Mark Stinson, M.D., J. Gray, R.N., Gary Mendivil, Gretchen Staeheli, Don Thomas.

### Administration, Liaison and Logistics:

Joan Miller (adviser), R. Dayton and G. Mendivil (Juneau liaison), Al Clough, R. Kaufman, L.D. Miller, Ross Miller, D. & E. Williams, N. Graham, B. Thoma, N. Vig, J. Wilson, W. Zeman.

### Camp and Field Operations:

Rebecca Dayton (logistics mgr.), P. Apostle, B. Hunt, Jack Lamb, Blake Larsen, Ben Looram, Don McCully, Monica Pavlik (camp mgr., staff asst.), A. Helmers, Dr. Jack Helle, J. & R. Merritt, Rick Neier (geology TA), Matt Nolan (geophysics TA), Matt Stoll (meteorology TA), G. Thoma, J. Thoma, Evan Thoms, (logistics & staff asst.), A. Wahlrab, Andy Young.

### Research Associates and Science Advisers (not in field):

Robert Asher, Calvin E. Anderson, D. Molenaar, Don A. Olson and Dr. A.W. Thompson, Found. for Glacier and Environmental Research, Seattle, WA; Dr. David Brew, Dr. Arthur Ford, Rich Goldfarb, U.S. Geological Survey; Ed Chacho, U.S. Army Corps of Engineers, CRREL, Fairbanks, AK; Dr. Harley Johansen, Univ. of Idaho; Dr. Jack Helle, Nat'l Marine Fisheries Service, NOAA, Auke Bay, AK; Austin E. Helmers, R. Merritt, Juneau, AK; Tom Stewart, Dr. D.N. Swanston, Dean Williams, Found. for Glacier Research; Scott Hulse, EIG, Inc., Boulder, CO; Dr. Heinz Miller, and Dr. W. Jokat, Alfred Wegener Polar Inst., Germany; Dr. Bjorn Kalltenborn, Dept. of Geog., Univ. of Oslo, Norway; Dr. Gottfried Konecny, Inst. of Surveying, Univ. of Hannover, Germany; Jack Lamb, Boise-Cascade Co., Boise, ID; Dr. David Lietzke, Univ. of Tennessee; Dr. Vernon Jones, Geog. Dept., Ferris St., Univ. Michigan; Dr. W. Mahaney, Dept. of Geog., York University, Ontario; Dr. Richard Marston, Dept. of Geog., Univ. of Wyoming; Dr. E. Muller, Dept. of Geol., Syracuse Univ., N.Y.; Dr. Frederick Nelson, Dept. of Geog., Rutgers Univ., N.J.; Dr. Gunnar Ostrem, Norwegian Water Resources & Energy Admin.; Dr. Robert Schuster, Engin. Geol. Branch, US Geological Survey, Denver, CO; Richard M. Shaw, Geophysics, Exxon Co., US, Denver; Dr. Heinz Slupetzky, Inst. of Geography, Univ. of Salzburg, Austria; Dr. Ann Tallman, Westinghouse-Hanford, Richland, WA; W. Brent Liddle, Chief Interpreter, Kluane National Park, Haines Junction, Yukon, Canada; Don Thomas, U.S. Geological Survey, Juneau, AK; Dr. Charles Waag and Dr. M. Wilson, Geol. Dept., Boise State Univ.; Dr. Gordon Warner, General Motors Corp., Pontiac, MI; Jim Wallis and John Harvey, FGER, Atlin, B.C.; Dr. David F. Woolnough, Nova Scotia Land Survey Institute, Lawrencetown, N.S., Canada



University of Idaho

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

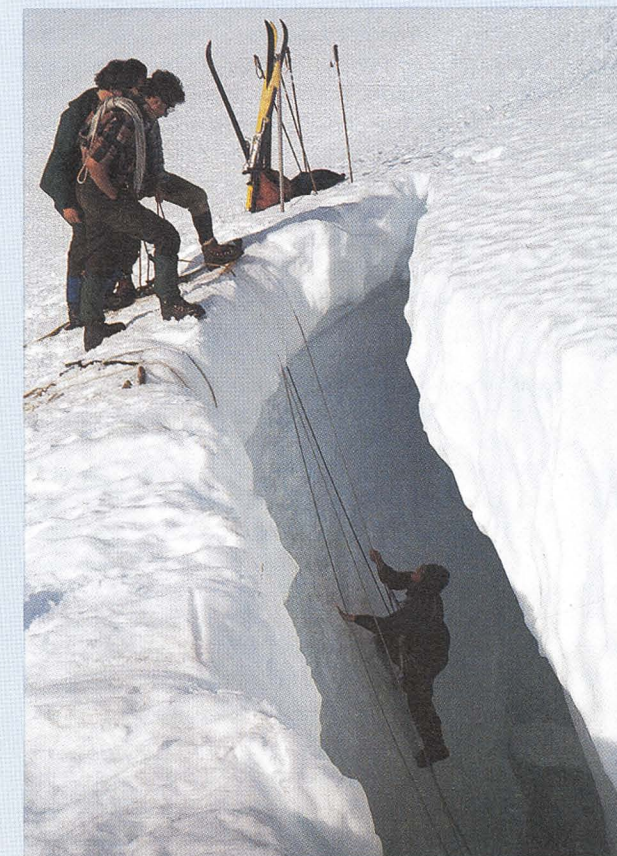
EXPEDITIONARY FIELD TRAINING,  
RESEARCH PARTICIPATION  
AND SEMESTER CREDITS IN

# ARCTIC AND MOUNTAIN SCIENCES

34th Summer Institute of  
Glaciological and Arctic Sciences

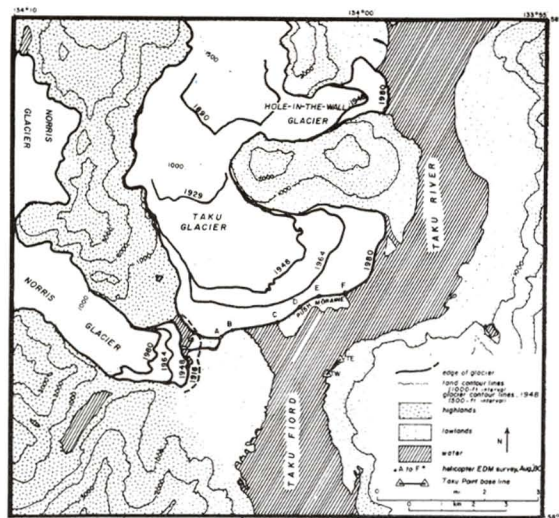
July 1 - August 25, 1993  
Juneau Icefield, Alaska  
and the Atlin Lake Region,  
B.C.-Yukon, Canada

University of Idaho, the University of  
Alaska Southeast, the Juneau Icefield Research  
Program, and the Foundation for Glacier and  
Environmental Research, Seattle, WA



Crevasse safety training on Lemon Creek Glacier (FGER).

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Advancing Taku and Hole-in-the-Wall Glaciers and receding Norris Glacier, 1890 to 1990.

## PURPOSE

The Juneau Icefield Research Program (JIRP) was organized in 1946 to pursue long-term research on interrelationships 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 conducted from July 1 to August 24. For qualified students interested in participation in JIRP and allied regional research projects, or for those desiring field work on thesis 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 research participation. Courses are offered in field geology, glaciology, geomorphology, surveying and selected environmental sciences, coordinated by D. M.M. Miller with visiting scientists assisting.

Up to 12 academic credits can be arranged through the Geology and Geography Departments, University of Idaho, and the summer school program of the University of Alaska Southeast.



View across the Twin Glaciers; source region and S.E. portion of the Juneau Icefield to Devil's Paw (8584').



Fully equipped a scientist skis to Camp 14, Juneau Icefield.



Palynology sampling in glacial bogs of the Atlin Lake sector.

Special topics considered are: 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 Geophysics; Mineral Prospecting; and Bedrock Geological Mapping.

Offerings take advantage of a classical glacial, periglacial and mountain and arctic environment in field and "laboratory" instruction.

The courses are offered under the aegis of the **University of Idaho** and the **University of Alaska Southeast**, being double listed in each institution's summer catalogue.

Lectures, field studies and problem sessions are held on adjunct topics. All offerings are concurrent during a concentrated, 8 week session on the Juneau Icefield, emphasizing Neoglacial conditions. Participants in the general courses are exposed to all offerings. The 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 (REU program) and graduate level scholarships supported by the University of Idaho, the National Science Foundation, the Foundation for Glacier and Environmental Research, the Rotary Club of Juneau and the Explorers Club field science training fund. Scholarships and contributions are also available for high school juniors and seniors via the Foundation, the Academy of Applied Science, the U.S. Army Research Office Research in Engineering Apprenticeship Program (REAP), and the NSF Young Scholars Program. Cooperative program grants are also available via U.S. Geological Survey & FGFR for selected foreign scientists. Research assistantships in ongoing programs are offered to outstanding previous participants or others with equivalent experience.

Subsidized places for additional U.S. participants are available at the field fee of **\$3200** for the 8 week session. All participants cover travel expenses between their home and Juneau, Alaska, and from 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 Provincial Wilderness Park of the Alaska-Canada Boundary Range between Juneau, Alaska and Atlin, B.C. 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 and periglacial features are observed. A permanent headquarters station is maintained at Atlin, B.C., from which a variety of field trips are 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 4000-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. North, Seattle, Washington, 98109. The summer field address is F.G.E.R., P.O. Box 20298, Juneau, Alaska, 99802-0298; and after August 1, Subarctic Research Station, P.O. Box 99, Atlin, B.C. Canada VOW 1AO.

## ELIGIBILITY

Participants must be enrolled in, or officially admitted for, work as candidates for a degree at their respective institutions. Exceptions are permitted where students are between programs and institutions in a long-term academic plan. A high scholastic record or potential is expected. Weight is placed on personal character, demonstrated interest and professional motivation. 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 administering this program the University of Idaho, the University of Alaska Southeast, and the Foundation for Glacier and Environmental Research will not discriminate on the grounds of race, creed, color, sex, or national origin.



On the lower Llewellyn Glacier near Camp 26.



Measuring snow & firn stratigraphy at test pit site.