

**Project title: Documenting the Current Behavior of Major Tidewater and Near-Tidewater Glaciers of Kenai Fjords National Park (KEFJ).**

**1. Provide the purpose/mission statement of the applicant Organization/Business, if applicable:** The USGS serves the Nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

**2. Describe the project for which this grant is being sought:**

During the summers of 2004 and 2005, a joint U.S. Geological Survey (USGS) – U.S. National Park Service (NPS) effort visited a number of locations within KEFJ from which photographs had been made during the first quarter of the twentieth century. At each location, a new photograph that duplicated the field of view of the historic photograph was made. Additionally, GPS was used to document the location of the photo site. The photo pairs were compared and significant information was produced about century scale changes in the behavior of many of KEFJ's glaciers. Unfortunately, most locations visited were significant distances from the termini of the glaciers that were photographed. In most cases, this was an indication of the significant amount of retreat that has occurred since the early twentieth century. Consequently, few detailed observations were made of the current behavior of the glaciers that were 'visited.'

The study proposed here for 2006 and 2007, takes a different, but very complimentary approach. Its purpose is to provide details about the current behavior of specific tidewater and non-tidewater glaciers located in KEFJ. Specifically it proposes to spend a day at each of a dozen (12) glaciers in KEFJ, documenting: 1) glacier terminus position and behavior; 2) character and type of the ice-marginal environment, including exposed bedrock; 3) composition, age, and location of proximal vegetation; and 4) presence and type of related faunal associations. The primary emphasis is on documenting current glacier behavior at: Bear, Aialik, Holgate, Little Holgate, Pedersen, Northwestern, Anchor, Ogive, Southwestern, McCarty, Dinglestadt, and Exit Glaciers.

Digital still images and film photographs will be made at each glacier visited. Where possible, a video record will also be made at each glacier.

Products will include reports, photographs, and GIS maps of investigated sites. All imagery and reports will be shared with KEFJ resource managers and interpreters. Results will be presented at scientific conferences and in peer-reviewed journals.

**3. Explain how the project benefits or relates to National Park Service programs, mandates and priorities with respect to Alaska coastal resources and ecosystems (maximum 200 words):**

This project will contribute to Park Service directives to preserve and document Park resources. Glaciers are an important resource and tell a compelling story about the recent history of KEFJ. Primary benefits of this project will be 1) new information to answer questions raised daily by Park visitors; and 2) new information for resource management about how the glacier resource is

changing on a variety of time scales. Future researchers will be able to use the newly acquired glacier observations as a baseline against which to compare and contrast observations that they will make for decades to come.

**4. List whether or not this project is on public land, private land, or both (attach a map of the project site location if applicable):** public land in KEFJ

**5. Provide a list of principal tasks and an approximate timeline for the completion of the principal tasks involved in this project:**

1. Visit each of 10 glacier locations and document current conditions and glacier behavior. At each glacier site, establish multiple new photo locations. After determining the coordinates of each location, collect a set of digital and film images for archiving.
2. Document the faunal and floral dynamics at each glacier margin.
3. Document the ice marginal environment around each glacier.
4. Photograph each glacier and its surrounding environment from the air.
5. Create GIS files and build reference database.
6. Prepare a descriptive narrative about the Post-Little-Ice-Age behavior of each glacier, emphasizing changes observed at varying time scales.

**6. Attach the following pertinent information for the key person/people working on the grant project:**

*Resume)*

**BRUCE FRANKLIN MOLNIA**

**EXPERIENCE:**

- C 2002 - present — Research Geologist, U.S. Geological Survey (USGS), Earth Surface Processes Team, Reston, VA -- monitor changes in the cryosphere, conduct studies of the impact of changing climate on the glaciers and landscapes of Alaska, and develop an Alaskan component of the U.S. National Coastal Assessment. Research involves field investigations and the use of remotely-sensed data, including: aerial and space-based photography and imagery, multi-spectral imagery, SAR and SLAR, and NTM.
- C 1999 -2003 --- Senior Legislative Fellow. House of Representatives Oceans Caucus - Office of Congressman Curt Weldon - organized and operated a caucus focused on ocean policy issues.
- C 1987- 2002 --- International Programs - Office of the Chief Geologist, USGS, Reston, VA -- coordinate international activities for USGS including organizing three international workshops on ocean pollution and Arctic contamination; develop new international programs and agreements; represent USGS and Department of Interior on interagency committees on environment, Arctic policy, global change, Antarctic environmental protection, international data management, and Federal Government response to Hurricane Mitch; 1999 -Acting Chief, International Programs; 1997 - 1999 – Deputy Chief, International Programs; 1994 - 2002 – Chief, International Environmental Studies; 1987 - 2002 — Chief, International Polar Programs.  
Research involves climate change, coastal and shallow marine processes, fiord and glacial-marine sedimentation, temperate glaciers, remote sensing, synthetic aperture radar (SAR), and use of multi-media for outreach and information distribution.
- C 1998 - present --- Adjunct Professor, Duke Univ., Nicholas School of the Environment, Durham, NC.
- C 1993 - present --- Research Affiliate, Prince William Sound Science Center, Cordova, AK.
- C 1990 - 2000 --- Forum Editor, *GSA TODAY*, Geological Society of America - wrote more than 100 science policy articles.
- C 1989 - present --- Affiliate Professor, University of Idaho, Department of Geology, Moscow ID.
- C 1985 - 1987--- Senior Program Officer & Acting Executive Director - Polar Research Board (PRB), National Research Council (NRC), National Academy of Sciences, Washington, D.C. & Supervisory Physical Scientist - USGS, Reston, VA -- managed and directed activities of the NRC's national advisory group on polar research; At USGS, Special Assistant to the Chief, National Mapping Division.
- C 1983 - 1985 --- Supervisory Physical Scientist - Deputy Chief for Data Production and Distribution, USGS Earth Resources Observation Systems (EROS) Data Center, Sioux Falls, SD -- management of the activities of a Branch with 100 employees involved in digital mapping and the processing and distribution of satellite imagery and aerial photography; responsible for: the acquisition and management of large digital geochemical and geophysical data bases (RASS and NURE), evaluation of new remote sensing technologies and instrumentation such as Side Looking Airborne Radar (SLAR), Large Format Camera (LFC), video data storage, etc.), and in the marketing and public awareness of USGS remote sensing programs and products.
- C 1982 - 1984 --- Adjunct Professor - California State University, Department of Geological Sciences, Northridge, CA.
- C 1982 - 1983 --- Vice President & Chief Geologist - Marine Environmental Science Associates, Inc., Northridge, CA -- management of: marine geophysical and geological consulting and research company that performed marine regional and site-specific mapping, marine surveying, hazards analysis, studies for platform and pipeline installations, and evaluations of resource potential of offshore oil and gas lease sale areas for the petroleum industry.

- C 1974 - 1982 --- Marine Geologist - USGS, Menlo Park, CA - Chief, Environmental Studies of the Eastern Gulf of Alaska and North Aleutian Shelf Projects -- planning, management, participation in, and analysis of results from marine geological and geophysical research projects and cruises to the Gulf of Alaska, Bering Sea, and Alaskan coastal zone environments; research topics - analysis of the geology of the Alaskan continental margin, interpretation of coastal and offshore processes, remote sensing, assessment of offshore U.S. marine mineral resources, definition and identification of marine geohazards, sea floor mapping, production of side scan sonar mosaics, and investigation of glacial-marine sedimentary processes.
- C 1975 - present --- Research and Teaching Staff - Juneau Icefield Research Project (JIRP), Juneau, AK.
- C 1973 - 1974 --- Geological Oceanographer - U.S. Bureau of Land Management (BLM), Pacific Outer Continental Shelf Office, Los Angeles, CA -- preparation of BLM environmental impact statements, contract monitoring, systematic evaluations of potential offshore lease areas.
- C 1972 - 1973 --- Visiting Assistant Professor of Geology - Amherst College, Amherst, MA and Mt. Holyoke College, South Hadley, MA.
- C 1971 - 1972 --- Science Editor - South Carolina Educational Television Network, Columbia, SC.
- C 1968 --- NSF Fellow - Juneau Icefield Research Program, Juneau, AK.
- C 1965 - 1967 --- Geophysical Research Assistant - Lamont-Doherty Geological Observatory, Palisades, NY -- collection and interpretation of marine seismic and gravity data in the Atlantic, Indian, Pacific, and Southern Oceans.

<b><u>EDUCATION:</u></b>	University of South Carolina	Ph.D.	1972
	Cornell University		1969 - 1970
	Duke University	M.A.	1969
	Michigan State University		Summer 1968
	Harpur College, State University of NY	B.A.	1967

**REGISTRATIONS:** Presently - Registered Professional Geologist in three states: Georgia, Alaska, and California; Certified Professional Geological Scientist # 6553, American Institute of Professional Geologists (1983 - 1989)

**MEMBERSHIPS:** American Association for the Advancement of Science, American Geophysical Union - Life Member, American Quaternary Association, Antarctic Society, American Society of Photogrammetry and Remote Sensing, Geological Society of America - Fellow, International Glaciological Society, Society of Sigma Xi - Life Member, The Explorers Club - Fellow.

**PUBLICATIONS:** Author, co-author, or editor of more than 200 articles, books (including: *Glaciers of Alaska* [2001], *Alaska's Glaciers* [1982, 1993] and *Glacial-Marine Sedimentation* [1983]), abstracts, technical reports, maps, and photographic slide sets. Oversaw production of five National Research Council Reports and three international workshop reports

**SHIPBOARD STUDIES:** Participation in more than 20 research cruises, 14 as Chief Scientist; areas of investigation: Antarctica, North and South Atlantic Oceans, Pacific Ocean, Indian Ocean, Southern Ocean, Gulf of Alaska, Bering Sea, Alaskan fiords, and offshore California

**FIELD STUDIES:** More than 30 years experience organizing and leading field expeditions in the US (AK, CA, HI, NC, SC, UT, VA); Chile; Iceland; Indonesia; and the Marshall Islands

**EDITORSHIPS & REVIEWER ACTIVITIES:** *GSA Today* - Editor: 1990 - 2000, *Geotimes* - Editorial Board: 1986 - 1994, *Journal of Sedimentary Petrology* - Associate Editor: 1978 - 1983;

**AWARDS:** USGS Shoemaker Communications Award -- 2004; Distinguished Service Award, Geological Society of America -- 2000; USGS Shoemaker Communications Award -- 1999; NSF Certificate of Appreciation -- 1995; Alaska Department of Natural Resources - Certificate and Letter of Appreciation -- 1995; Secretary of Interior's Volunteer for Science Award -- 1993; NRC Associate Program Advisor -- 1978 -1982; U.S. Government Antarctic Service Medal -- 1968

**GRANTS:** NSF SGER Grant -- 1993 -1994; USGS Climate Program Grants -- 1978 -1981, 1993 - 1995; Merrill Foundation Trust Grant - -1973 - 1974; NSF Arctic Science Research Institute Fellowship -- 1968 and Graduate Research Fellowships --1967 - 1972; New York State Regents Scholar -- 1963 - 1966

**PROFESSIONAL SOCIETY POSITIONS HELD:** Geological Society of America Councilor 2003- present; International Division - Secretary-Treasurer 2002 - 2003, President 1994 - 1995, Vice-President 1993 - 1994; Publication Committee -- 1991 - 1997. AAAS Member-at-Large, Geology and Geography Section

-- 1999 -2004, AAAS Steering Committee - Consortium of Affiliates of International Programs 1996 - 1999.

**CONTACT INFORMATION:**

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