

CURRICULUM VITÆ  
for  
**Richard Sugden Williams, Jr., Ph.D.**

**Profession:** Geologist

**Birthplace:** Borough of Manhattan, New York, New York, U.S.A.

**Birth Date:** 6 December 1938

**Wife:** Mary Ellen (Davis) Williams; two sons: Jonathan Fellows Williams and Christopher Davis Williams

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## **Education:**

Colby College	Physics & Mathematics	1956-1958	Transferred
University of Michigan	Geology	1958-1961	B.S. - 1961
University of Michigan	Geology & Geography	1961-1962	M.S. - 1962
Pennsylvania State Univ.	Geology	1962-1965	Ph.D. - 1965
	Minors: Geography & Meteorology		

## **Post-graduate and Other Technical Courses:**

- 1964 – Universidad de Puerto Rico, Río Piedras, P.R. - Spanish 91 (Español para extranjeros)
- 1972 – U.S. Civil Service Commission Management Institute for Supervisory Scientists and Engineers (1 week)
- 1973 – 1974 - Old Norse (2 semester courses), George Washington University, Washington, D.C., Division of Continuing Education - Icelandic language study; Prof. Jack Albe.
- 1988 – Field Course in Glaciology and Glacier Hydrology at Place Glacier, Coast Mountains British Columbia, Canada (under the auspices of Carleton University, Ottawa, Canada) (2 weeks); Instructions from the Norwegian Water and Power Authority: Prof. Gunnar Østrom and Dr. Nils Haakensen.
- 1989 – Federal Executive Institute (OPM), Charlottesville, VA - Executive Excellence Program (158) - Leadership for a Democratic Society (4 weeks)

## **Professional Experience:**

### **2004 - (Part time):**

Woods Hole Research Center, Woods Hole, MA

Position: Adjunct senior scientist; specialist on global change in the Earth's cryosphere, with emphasis on glaciers and focus on the glaciers of Iceland

### **1991-2008:**

U.S. Geological Survey, Woods Hole Science Center, Woods Hole, MA:

Position: Senior research geologist (ST-00); specialist on aerial and satellite remote sensing of active geomorphic processes, especially glaciers, volcanoes, and coastal regions. Project Chief, Glacier Studies Project, with two international sub-projects: 11-volume USGS Professional Paper 1386 A-K, Satellite Image Atlas of Glaciers of the World and Map I-2600-A-X, Coastal-Change and Glaciological Maps of Antarctica. Also, collaboration with Oddur Sigurðsson (National Energy Authority of Iceland) on an international project, Remote Sensing of Glaciers of Iceland; and with Dorothy K. Hall, Branch of Cryospheric Processes, Goddard Space Flight Center, on satellite remote sensing of glaciers.

**1988-1991:**

U.S. Geological Survey, Geologic Division, National Center, Reston, VA

Positions: (1) Senior research geologist (GS-15) on aerial and satellite remote sensing of geomorphic processes, especially glaciers, volcanoes, and coastal regions; and (2) served as USGS and, DOI liaison to Committee on Earth and Environmental Sciences (CEES) and National Academy of Sciences (NAS) for Solid Earth Processes and Sea-Level Change and as Science Element Task Leader, Solid Earth Processes Task Group (9 Federal agencies) and Major Initiatives Program Leader, Sea-Level Change, Global Change Working Group (Chair: Robert W. Corell, Associate Director, NSF), CEES (Chair: Dallas L. Peck, Director, USGS), Federal Coordinating Council for Science, Engineering, and Technology, Office of Science and Technology Policy.

**1983-1988:**

U.S. Geological Survey, Geologic Division, National Center, Reston, VA

Position: Senior research geologist (GS-15) on aerial and satellite remote sensing of geomorphic processes and geologic hazards; chiefly photogeologic and thermal infrared studies of volcanoes, geothermal areas and glaciers, with particular emphasis on geologic and geomorphic processes in Iceland.

**1971-1983:**

U.S. Geological Survey, EROS Program Office, Washington, DC, and Reston, VA

Positions: (1) Research geologist (GS-13, GS-14, GS-15) on airborne and satellite remote sensing of dynamic geological phenomena and geologic hazards; chiefly photogeologic and thermal infrared studies of volcanoes, geothermal areas and glaciers, with particular emphasis on active geologic and geomorphic processes in Iceland. Aerial photographs and satellite images were also used to monitor coastline changes on Cape Cod, Massachusetts; and (2) scientific coordinator for all ERTS-1, ERTS-2 (Landsat-2) and Skylab (EREP) proposals from the Department of the Interior. Member of NASA Review Panel for ERTS-1 proposals. Principal investigator for ERTS-1 project, Satellite Geological and Geophysical Remote Sensing of Iceland, in cooperation with the Icelandic National Research Council (six-year project).

**1969-1971:**

U.S. Air Force Cambridge Laboratories (AFSC), Hanscom Field, Lincoln, MA

Position: Chief, Geotechnics Branch, Terrestrial Sciences Laboratory, and Research geologist (GS-13) specializing in airborne geological remote sensing, particularly analysis of thermal infrared and non-conventional aerial photography and imagery for geological and geophysical applications. Responsible for planning and execution of geological research with aerial sensors mounted in an RC-130A/D Hercules ski-equipped research aircraft.

**1968-1969:**

U.S. Air Force Cambridge Laboratories (AFSC), Hanscom Field, Lincoln, MA  
Position: Research general physical scientist (GS-13), Geotechnics Branch, Terrestrial Sciences Laboratory, specializing in remote sensing, particularly analysis of thermal infrared imagery and spectrophotography for geologic and geophysical applications. Responsible for technical management, planning, and execution of airborne geological research program (RC-130A/D Hercules ski-equipped research aircraft), specifically airborne thermal infrared imagery and spectrophotography.

**1965-1968:**

U.S. Air Force Cambridge Laboratories (AFSC), Hanscom Field, Lincoln, MA  
Position: First Lieutenant, USAF, AFCRL, Office of Aerospace Research, specializing in remote sensing, particularly analysis of thermal infrared imagery and spectrophotography for geologic and geophysical applications. Responsible for planning and execution of airborne geological research program, specifically airborne thermal infrared imagery and spectrophotography: Aircraft project scientist (more than 350 hours flying in an RC-130A/D Hercules ski-equipped research aircraft).

**1965 (Summer):**

HRB-Singer, Inc., State College, PA.  
Position: Research geologist responsible for conducting research in the geological and geomorphological application of various remote sensing techniques; e.g., aerial photographs, thermal infrared imagery, etc. Responsible for writing proposals (responses to Fed. Gov. RFQ's in Commerce Business Daily) and working on government contractual (DOD) research projects. Completed several classified in-house research reports. Major research interest and activity was on the geologic application of airborne infrared sensing techniques. Also gave technical briefings (company sales representative) to prospective customers.

**1964:**

Río Piedras, Puerto Rico  
Position: Field geologist carrying out field work on the northern coastal plain of Puerto Rico for Ph.D. dissertation in Department of Geology and Geophysics, Pennsylvania State University.

**1962-1963:**

Pennsylvania State University, University Park, Pennsylvania  
Position: Graduate Teaching Assistant, Department of Geology and Geophysics

**1962 (Summer):**

Atlantic Refining Co., Dallas, Texas

Position: Staff photogeologist. Conducted photogeologic analyses of aerial photographs of Alaskan North Slope and southwestern New Mexico for future petroleum exploration and development. Prepared overlays and aerial photographic mosaics. Conducted research and prepared maps showing distribution and thickness of potash deposits in Saskatchewan, Canada, for future purchase of mineral rights and development.

**1960-1962 (Part time):**

University of Michigan Institute of Science and Technology, Ann Arbor, Michigan

Position: Research assistant in geophysics for Prof. John M. DeNoyer, University of Michigan. Prepared Bouguer gravity anomaly map of portions of San Luis Valley, Sangre de Cristo Mts., Huerfano Park, and Wet Mts., Colorado, from field data acquired by Dr. DeNoyer. Made terrain corrections for more than 500 gravity stations, made regional gravity corrections, and prepared map showing structural configuration on the basement as inferred from the gravity observations and theoretical sediment densities in the valleys.

**1959 (Summer):**

Edwards Air Force Base, Cape Cod, MA

Position: U.S. Air Force ROTC cadet; 6-week training course.

Barnes Engineering Company, Inc., Auburndale, MA

Position: Rodman on a surveying crew, surveying the road alignment for Route I-495

**1957 and 1958 (Summers):**

Raytheon Manufacturing Company, Newton, MA

Position: Engineering Assistant B (1957), Engineering Assistant A (1958), Transistor Development Laboratory, Raytheon Mfg. CO., Newton, Mass. General laboratory technician. Tested electronic components with Tektronix oscilloscope, prepared graphs, and assisted in data reduction. Evaluation of Si and Ge transistor performance. Operated REAC (Reeves Electronic Analogue Computer) to simulate doping of transistor materials under controlled atmospheres using Jaeger's heat-flow equations.

## **Scientific Leadership:**

During my 36-year association with the U.S. Geological Survey (USGS) (42+ years of Federal service), I have made significant scientific and management contributions to several USGS missions and programs that demonstrate effective leadership to the organization: (1) ERTS (Landsat) Program; (2) U.S. Global Change Research Program; and (3) establishment of Satellite Glaciology as an international scientific program. I have managed successfully to balance scientific program-development responsibilities with project research throughout my nearly four-decade career with the USGS.

Between 1971 and 1983, I was on the staff of the EROS Program, initially a component in the Director's Office (under Director William T. Pecora) to serve the divisions of the USGS and other DOI bureaus by introducing satellite imagery into various programs. The EROS Program's greatest legacy was the establishment of the EROS Data Center. I provided coordination between the divisions and the bureaus and NASA in NASA-funded projects (including my Iceland project) for ERTS-1 and Landsat-2. USGS Professional Paper 929, *ERTS-1, A New Window on Our Planet*, provides a comprehensive summary of the USGS and DOI contributions to the national Landsat program.

From 1987-1991, I was actively involved in the development of the USGS Global Change Research Program and the 12-Federal agency U.S. Global Change Research Program, including Chair, Solid Earth Processes Task Group, and Major Initiatives Program Leader, Sea-Level Change. My colleague, Thomas A. Ager, and I worked hard to boost the Geologic Division's Global Change and Climate History Funding from \$1 million to \$12 million per year and the USGS Global Change Research Program to about \$35 million per year. We achieved this in spite of lack of leadership from the Director, USGS, and Secretary, DOI, neither of whom supported intellectually or scientifically the U.S. Global Change Research Program and its objectives. My most important contribution was the preparation of a discussion paper in 1987 that provided the intellectual and scientific basis for the USGS to be involved actively in the U.S. Global Change Research Program: [Williams, R.S., Jr., 1987, The USGS and global change. A discussion paper: USGS, Geologic Division report, 43 p.].

As part of my strong commitment to involve the USGS in cooperative international programs that use satellite image data to globally monitor changes on the Earth's surface resulting from natural and anthropogenic processes and drawing from my U.S. Air Force airborne remote sensing research in Iceland and my USGS satellite remote sensing in Iceland (Landsat), I pioneered the concept of using satellite images of the Earth to establish a baseline of the areal distribution of glacier ice on Earth and, through subsequent imaging, to monitor and analyze changes in glacier area. This concept provided the basis for two major international projects: Satellite Image Atlas of Glaciers of the World (USGS Professional Paper 1386 A-K), an 11-volume series; and Coastal-Change and Glaciological Maps of Antarctica, a 25-map series (I-2600-A-X), to monitor and analyze changes in the coast of Antarctica using satellite images. Both efforts involve collaboration with USGS scientists in two or more divisions, other U.S. institutions, and foreign institutions. In addition to these major scientific efforts, the work has spawned numerous journal articles and invited papers at workshops and symposia.

Late in CY 2012, USGS management, to meet an unexpected budgetary shortfall, unilaterally stripped all remaining funds (\$90,000) out of a Congressionally protected Working Capital Fund account that were to be used to publish the final (11<sup>th</sup>) volume in the Satellite Image Atlas of Glaciers of the World series, USGS Professional Paper 1386-D, Glaciers of Iceland (with 1:600,000-scale Map of the Glaciers of Iceland), a collaborative international effort with several Icelandic scientific institutions, including the Icelandic Meteorological Office. Research also effectively ended on the Coastal-Change and Glaciological Maps of Antarctica series (I-2600-A-X). Ten of the Antarctic coastal-change maps have been published, with the 11<sup>th</sup> map (I-2600-J-K) “stranded” since 2013 in the Cartographic Unit of the USGS Publication Service Center (Reston, VA). Publication of the 11<sup>th</sup> map would complete the entire coast of West Antarctica plus the Amery Ice Shelf in East Antarctica.

### **Honors, Awards, Elected Memberships, and Other Professional Recognition:**

#### **Academic Awards:**

- 1956 – National Honor Society at Newton High School
- 1956 – \$200 Scholarship from Newton High School for first year at Colby College
- 1958 – Sigma Pi Sigma (Physics Honorary)
- 1959 - \$200 "L.S. & A. General Scholar" Scholarship - Awarded while a senior in geology at the University of Michigan
- 1960 – Chicago Tribune Gold Medal Award - AFROTC award at the University of Michigan for outstanding scholarship and leadership
- 1960 – Detroit News Award - AFROTC award at the University of Michigan for scholarship and leadership
- 1961 – Sigma Gamma Epsilon (Geology Honorary)
- 1962 – Society of Sigma Xi
- 1962-1963 – \$1800 Graduate Teaching Assistantship to pursue Ph.D. studies at the Pennsylvania State University
- 1963-1964 – \$2400 National Science Foundation Cooperative Graduate Fellowship
- 1964-1965 – \$3300 National Science Foundation Cooperative Graduate Fellowship

#### **Professional Society Awards:**

- 1978 – Alan Gordon Memorial Award (American Society of Photogrammetry) (given annually to honor significant achievements in remote sensing and photographic interpretation). Co-recipient with Wm. D. Carter for work as author-editors of "ERTS-1, A New Window on Our Planet," No. 929 of the USGS Professional Paper Series.
- 1979 – Meritorious Service Award, American Society of Photogrammetry (recognition for service as Member, Board of Direction)
- 1988 – Editor's Citation for Excellence in Refereeing of Reviews of Geophysics from the American Geophysical Union.
- 1996 – Certificate of Appreciation awarded for volunteer services in K-12 geoscience education. Awarded by the Partners for Education Program 1996 of the Geological Society of America.

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**Military Service Ribbons and Awards:**

**Ribbons:**

- 1965 – National Defense Service Medal
- 1965 – Air Force Outstanding Unit Award
- 1967 – Small Arms Expert Marksmanship

**Awards:**

- 1966 – Airman's Medal (For Heroism)
- 1968 – Air Force Commendation Medal
- 1968 – Nominee for U.S. Air Force Research and Development Award
- 1968 – Nominee for Office of Aerospace Research Junior Officer of the Year Award
- 1968 – Armed Forces Management Association (Boston Chapter) Speaker-of-the-Year Award (1967-1968) "Management Problems at the Grass Roots: A Scientist's Viewpoint"

**Civil Service Awards:**

- 1970 – Outstanding Performance Rating and Quality Salary Increase (USAF)
- 1974 – Outstanding Performance Rating and Quality Salary Increase (USGS)
- 1977 – Graphics Communications Award (USGS)
- 1979 – Meritorious Service Award (U.S. Dept. of the Interior)
- 1980 – Outstanding Performance Rating and Quality Salary Increase (USGS)
- 1983 – Outstanding Performance Rating (USGS)
- 1984 – Outstanding Performance Rating (USGS)
- 1985 – Outstanding Performance Rating (USGS)
- 1988 – Outstanding Performance Rating (USGS)
- 1989 – Outstanding Performance Rating (USGS)
- 1990 – Outstanding Performance Rating (USGS)
- 1991 – Citation for outstanding contributions to the development of the Joint Education Initiative (JEdI) (USGS)
- 1992 – Outstanding Performance Rating (USGS)
- 1992 – Nominated by the USGS for the Distinguished Service Award of the U.S. Department of Interior and forwarded to U.S. DOI for concurrence and action in 1992
- 1993 – Outstanding Performance Rating (USGS)



- 1994 – Unit Award for Excellence of Service (U.S. Geological Survey Transition Team)  
(U.S. Dept. of the Interior)
- 1994 – Outstanding Performance Rating (USGS), including a \$2,700 cash award
- 1995 – Outstanding Performance Rating (USGS)
- 1996 – Distinguished Service Award (U.S. Department of the Interior)
- 1997 – Nominated by the U.S. Geological Survey for promotion to ST-Scientist. Nomination forwarded to the U.S. Department of the Interior for concurrence and action in February 1998
- 1998 – Promoted to Senior Research Geologist - ST-00
- 2006 – STAR Award (USGS), including \$2,000 cash award
- 2007 – Exceptional Performance Rating (USGS), including a \$5,000 cash award
- 2009 – Co-awardee of NASA Goddard Space Flight Center Hydrospheric and Biospheric Laboratory (Earth Sciences Division) Peer Award for Best Paper (see Scientific Publications Paper No. 227, p. 29).

**Elected Memberships:**

- 1970 – Geological Society of America (Fellow)
- 1976 – Cosmos Club
- 1980 – Corresponding (Foreign) Fellow of the Icelandic Science Society
- 1981 – Explorers Club (Fellow)
- 1996 – American Association for the Advancement of Science (Fellow)

**Other Professional Recognition:**

- 1991 – A new species of Pliocene ostracode, *Robertsonites williamsi*, was named in honor of Richard S. Williams, Jr., U.S. Geological Survey, for research on Icelandic geology. Cited in Cronin, T.M., 1991, Late Neogene marine ostracoda from Tjörnes, Iceland: *Journal of Paleontology*, v. 65, no. 5, p. 767-794.
- 1994 – Williams Glacier, a tributary to Emmanuel Glacier, Royal Society Range, Victoria Land, Antarctica, named by the U.S. Advisory Committee on Antarctic Names (US-ACAN) in honor of Richard S. Williams, Jr., for his global glaciological research, including Antarctica. Cited in Alberts, F.G., compiler and editor, 1995, *Geographic names of the Antarctic*; 2nd edition: Names approved by the United States Board on Geographic Names, National Science Foundation, NSF 95-157, p. 815. On 1997 map of Mount Lister, Antarctica: U.S. Geological Survey/Land Information New Zealand, 1:50,000 scale.
- 1995 – Received a Federal Design Achievement Award from the National Endowment for the Arts for the design of the Planetary Maps poster/brochure that was published by the U.S. Geological Survey in 1992. Award given by Jane Alexander, Director, NEA, at the Smithsonian Institution's Cooper-Hewitt Museum, New York, New York, on 14 July 1995.

- 1999 – Selected by the NASA Goddard Space Flight Center’s Scientific Colloquium Committee to present the 6<sup>th</sup> Annual William Nordberg Memorial Lecture on 19 November 1999 at NASA Goddard Space Flight Center, Greenbelt, Maryland. I chose Iceland: Dynamic Land of Ice and Fire as the lecture topic. As the Nordberg Lecturer, I was invited to spend the week at Goddard Space Flight Center and to present other lectures and meet with scientists working in NASA Earth Science Enterprise Program. I gave two other lectures during the visit. The Earth’s Cryosphere and Global Environmental Change on 17 November 1999 and Natural and Human History of the Earth: What is the Fate of the Biosphere? on 18 November 1999.
- 2003 – Williams Ice Stream, an ice stream which flows into the Venable Ice Shelf, Bryan Coast, Ellsworth Land, Antarctica, named by the U.S. Advisory Committee on Antarctic Names (US-ACAN) in honor of Richard S. Williams, Jr., for his research on coastal-change and glaciological maps of Antarctica *on* 2003 Coastal-change and Glaciological Map of the Eights Coast Area: 1972B2001: U.S. Geological Survey Geologic Investigations Series Map IB2600BE, 1:1,000,000 scale.
- 2003 – Annie Award given by the Corporate Services Division (CSD), National Geographic Society (NGS), to Richard S. Williams, Jr., Vice Chair, Committee for Research and Exploration, for distinguished service to the Society. The award is named after Ann Judge and given to those individuals within the CSD who continually go the “extra mile.” I am the third individual outside the division to receive the award. Ann Judge, Director, Travel Office, NGS, was killed on 11 September 2001, when an American Airlines aircraft was flown into the Pentagon by Saudi Arabian assassins. Ann Judge was a good friend, so the award has extra meaning to me personally.
- 2007 – Selected by the University of Miami Rosenstiel School of Marine and Atmospheric Science (RSMAS) to present the 4<sup>th</sup> Annual Henri and Adele Bader Lecture, Miami, Florida. Two lectures were presented on “The Earth’s Dynamic Ice: The Meltdown.” On 27 March 2007, the first lecture was given to high school students of MAST Academy (Maritime and Science Technology High School), on 28 March 2007, the second lecture was given to faculty and students at RSMAS and to the general public.
- 2014 – Award from Prof. James W. Head, III, Planetary Geology Laboratory, Geological Sciences, Brown University, Providence, RI, on 7 November 2014, in recognition of my pioneering discovery in 1978, from analysis of Viking Orbiter images of Mars, of geomorphological evidence of a former ice cap on Arsia Mons, one of three Tharsis volcanoes located in the “equatorial” region of Mars.

### **Scientific Publications (Journal Papers, Book Chapters, Books, Edited Books, etc.):**

1. Williams, R.S., Jr., and Freed, R.L., 1962, Geology of the Buck Mountain area, Costilla County, Colorado: Ann Arbor, Michigan, University of Michigan, Department of Geology and Mineralogy, M.A. thesis, 49 p.
2. Williams, R.S., Jr., 1965, Geomorphology of a portion of the northern coastal plain of Puerto Rico: University Park, Pennsylvania, Pennsylvania State University, Department of Geology and Geophysics, Ph.D. dissertation, 191 p. (microfilm).
3. Williams, R. S., Jr., and Fenn, R. W., 1967, Degradation of imagery from optical-mechanical scanners: Moisture condensation on optics: U.S. Air Force Cambridge Research Laboratories Environmental Research Papers No. 269 AFCRL-67-0398, 18 p.
4. Williams, R. S., Jr., and Ory, T. R., 1967, Infrared imagery mosaics for geological investigations: *Photogrammetric Engineering*, v. 33, no. 12, p. 1377-1380.
5. Friedman, J. D., Williams, R. S., Jr., Miller, C. D., and Pálmason, Gudmundur, 1967, Infrared surveys in Iceland in 1966, *in* Surtsey Research Progress Report: Reykjavík, Iceland, The Surtsey Research Society, v. 3, p. 99-103.
6. Neal, J.T., and Williams, R.S., Jr., 1967, Conventional photography; Williams, R.S., Jr., 1967, Thermal infrared imagery, 1967; *in* Bliamptis, E.E., ed., Remote sensing of the geological environment: Terrestrial Sciences Laboratory, Air Force Cambridge Research Laboratories, L.G. Hanscom Field, Bedford, MA, p. 5-9.
7. Williams, R. S., Jr., 1968, Geology: Earth Sciences Technologies Association, Earth Sciences Profile Series No. 5, 8 p.
8. Williams, R. S., Jr., Friedman, J. D., Thorarinsson, Sigurdur, Sigurgeirsson, Thorbjörn, and Pálmason, Gudmundur, 1968, Analysis of 1966 infrared survey of Surtsey, Iceland, *in* Surtsey Research Progress Report: Reykjavík, Iceland, The Surtsey Research Society, v. 4, p. 177-192.
9. Cronin, J. F., Rooney, T. P., Williams, R. S., Jr., Molineaux, C. E., and Bliamptis, E. E., 1968, Ultraviolet radiation and the terrestrial surface: U.S. Air Force Cambridge Research Laboratories, Special Report 83, AFCRL-68-0572, 34 p.
10. Friedman, J. D., and Williams, R. S., Jr., 1968, Infrared sensing of active geologic processes, *in* Symposium on Remote Sensing of Environment, 5th, Proceedings: Ann Arbor, Michigan, Institute of Science and Technology, University of Michigan, p. 787-820.
11. Williams, R. S., Jr., 1969, Degradation of infrared caused by condensation: *Photogrammetric Engineering*, v. 35, no. 1, p. 72-78.
12. Friedman, J. D., Williams, R. S., Jr., Pálmason, Gudmundur, and Miller, C. D., 1969, Infrared surveys in Iceland in 1966, *in* Geological Survey Research 1969: U.S. Geological Survey Professional Paper 650-C, p. C89-C105.
13. Merifield, P. M., Cronin, J. F., Foshee, L. L., Gawarecki, S. J., Neal, J. T., Severson, R.W., Stone, R O., and Williams, R.S., Jr., 1969, Satellite imagery of the Earth: *Photogrammetric Engineering*, v. 35, no. 7, p. 654-688.
14. Merifield, P. M., Saari, J. M., Shorthill, R. W., Wildey, R. L., Wilhelms, D. E., and Williams, R. S., 1969, Interpretation of extraterrestrial imagery: *Photogrammetric Engineering*, v. 35, no. 5, p. 477-492.

15. Williams, R. S., Jr., and Friedman, J. D., 1970, Satellite observation of effusive volcanism: *Interplanetary Society Journal*, v. 23, no. 6, p. 441-450.
16. Friedman, J. D., and Williams, R. S., Jr., 1970, Comparison of 1968 and 1966 infrared imagery of Surtsey, *in Surtsey Research Progress Report: Reykjavík, Iceland, The Surtsey Research Society*, v. 5, p. 90-94.
17. Friedman, J. D., and Williams, R. S., Jr., 1970, Changing patterns of thermal emission from Surtsey, Iceland, between 1966 and 1969, *in Geological Survey research 1970: U.S. Geological Survey Professional Paper 700-D*, p. D116-D124.
18. Stringham, J. A., and Williams, R. S., Jr., 1970, Applications of reconnaissance concepts to mapping problems, *in Geodetic and Research and Development Symposium Proceedings: Department of Defense Geodetic-Cartographic-Target Materials Conference, 7th, Cameron Station, Virginia*, p. 37-105.
19. Del Bono, G. L., Williams, R. S., Jr., and Cronin, J. F., 1971, Photogeologic and thermal infrared imagery geologic surveys in Italy in 1966: *Bolletino del Servizio Geologico d'Italia*, v. 91, 1970, p. 3-44.
20. Friedman, J. D., Johansson, C. E., Óskarsson, Niels, Svensson, Harald, Thorarinsson, Sigurdur, and Williams, R. S., Jr., 1971, Observations on Icelandic polygon surfaces and palsa areas: Photo interpretation and field studies: *Geografiska Annaler*, v. 53, ser. A., nos.3-4, p. 115-145.
21. Oldale, R. N., Friedman, J. D., and Williams, R. S., Jr., 1971, Changes in coastal morphology of Monomoy Island, Cape Cod, Massachusetts, *in Geological Survey research 1971: U.S. Geological Survey Professional Paper 750-B*, p. B101-B107.
22. Pálmason, Gudmundur, Friedman, J. D., Williams, R. S., Jr., Jónsson, Jón, and Sæmundsson, Kristján, 1971, Aerial infrared surveys of Reykjanes and Torfajökull thermal areas, Iceland, *with a section on Cost of exploration surveys*, *in United Nations Symposium on the Development and Utilization of Geothermal Resources, Pisa, Italy, 1970, Proceedings: Geothermics, special issue*, v. 2, pt. 1, p. 399-412.
23. Williams, R. S., Jr., 1972, Thermography: *Photogrammetric Engineering*, v. 38, no. 9, p. 881-883.
24. Williams, R. S., Jr., 1972, Terrestrial remote sensing: Applications of thermal infrared scanners to the geological sciences, pt. 3 *of ISA Transducer Compendium: Pittsburgh, Pennsylvania, Instrument Society of America*, p. 219-236.
25. Williams, R. S., Jr., and Fernandopullé, Denis, 1972, Geological analysis of aerial thermography of the Canary Islands, Spain, *in International Symposium on Remote Sensing of Environment, 8th, Proceedings: Ann Arbor, Michigan, Environmental Research Institute of Michigan*, p. 1159-1194.
26. Friedman, J. D., Williams, R. S., Jr., Thorarinsson, Sigurdur, and Pálmason, Gudmundur, 1972, Infrared emission from Kverkfjöll subglacial volcanic and geothermal area, Iceland: *Jökull*, v. 22, p. 27-43.
27. Williams, R.S., Jr., 1972, Thermography; *in Gary, Margaret, McAfee, Robert, Jr., and Wolf, Carol L, eds., Glossary of Geology: Washington, D.C., American Geological Institute*, p. 736.
28. Williams, R.S., Jr., 1972, Reflected solar energy and thermography; *in Fischer, W.A., Status of remote sensing: in Proceedings of the 12<sup>th</sup> Congress of International society for Photogrammetry, Ottawa, Canada, July 31, 1972*, p. 7-13.

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117. Shuman, C.A., Sigurðsson, Oddur, Jónsdóttir, J.F., Williams, R.S., Jr., and Hall, D.K., 2008, Comparison of the topography of Drangajökull ice cap, Iceland, cloud-cleared ICESat profiles and GPS ground-survey and GIS data: *in* Abstracts, International Workshop on Mass Balance Measurements and Modelling (26-28 March 2008; Skeikampen, Norway), International Glaciological Society.
118. Sigurðsson, Oddur, and Williams, R.S., Jr., 2008, Assessment of the area of glaciers in Iceland at the beginning of the 21<sup>st</sup> century: *in* Abstracts, International Workshop on World Glacier Inventory (20-24 September 2008; Lanzhou, China), International Glaciological Society.
119. Shuman, C.A., Sigurðsson, Oddur, Williams, R.S., Jr., and Hall, D.K., 2009, Elevation change of Drangajökull, Iceland, from cloud-cleared ICESat repeat profiles and GPS ground-survey data [abs.]: *in* Abstracts, 66<sup>th</sup> Eastern Snow Conference (Niagara Falls, Ontario, Canada).
120. Williams, R.S., Jr., 2013, The Earth's disappearing cryosphere: glaciers, snow cover, floating ice, and permafrost [abs.]; *in* Abstracts. American Polar Society, 75<sup>th</sup> Anniversary Meeting and Symposium [The Polar Regions in the 21<sup>st</sup> Century: Globalization, Climate Change and Geopolitics], (15-18 April 2013, Marine Biological Laboratory, Woods Hole, MA, p. 16.

**Lectureships and Other Academic Activities:**

- 1973 – Barbour-Schramm Memorial Lecturer, Department of Geology, University of Nebraska, Lincoln, Nebraska
- 1974 – Guest Lecturer, Seminar on Remote Sensing [University of Iceland], Nordic House, Reykjavík, Iceland (6 lectures presented)
- 1978 – Canada Institute of Mining and Metallurgy Lecturer, St. Mary's University, Dalhousie University and Nova Scotia Technical College, Halifax, Nova Scotia, Canada, and Memorial University of Newfoundland, St. Johns, Newfoundland, Canada
- 1979 – U.S. Geological Survey - Sigma Xi Centennial Lecturer (9 Centennial and 6 ancillary lectures presented to various universities during the year)
- 1980 – Nordic Countries lecturer (sponsored by the Swedish Space Board for Space Activities), 14 lectures-presented at various universities in Denmark, Sweden, and Norway
- 1983 – University of Iceland (Reykjavík, Iceland) Lecturer (sponsored by the Dept. of Geosciences, Div. of Science & Engineering), several lectures presented
- 1989 – Panelist at the Global Change and Our Endangered Environment Symposium, Bloomsburg University, Pennsylvania, 17-18 October 1989. Address: Global Change in the Geosphere

- 1990 – Speaker at Geology and Geophysics Seminar, Clark Building, Woods Hole Oceanographic Institution, “Interrelationship of Global Change in the Cryosphere and Hydrosphere (Oceans),” Quissett Campus, Woods Hole, MA, on 7 August 1990
- 1992 – Speaker and panel member at an American Geophysical Union-sponsored Shell Science Seminar, The Latest in Science and Technology, National Science Teacher’s Association convention, Boston, MA [Set of 20 annotated slides prepared for sale and distribution by AGU to science teachers. (AGU Slide Set No. SL-7)]
- 1992-1994 – Georgetown University Visiting Professor on the Faculty of the School of Foreign Service as part of the World Affairs Program directed by Distinguished Professor Harm de Blij. Responsible for giving a series of seven to fourteen illustrated scientific lectures on topics of current interest (Theme: “Our Changing Planet”) on cruise ships operated by Cunard’s Royal Viking Cruise Line (3) in various parts of the world. Four trans-oceanic cruises completed
- 1993 – Co-leader (with Robert N. Oldale, James V. O’Connor, and Brian B. Tormey) of Geological Society of America post-meeting (1993 Annual Meeting, Boston, MA) field trip for K-12 teachers sponsored by the National Association of Geology Teachers: Evolution of Cape Cod Landscapes: Marine and Glacial Geology Field Techniques Applied to Cape Cod [GSA Today, v. 3, no. 6, p. 153] [See USGS Open-File Report 93-618 for field guide (30 October 1993)]
- 1994 – One of three panelists at a public colloquium, “Satelliten ser mer än du tror!” [Satellites see more than you think!], in Stockholm, Sweden, on 7 June 1994, held at Moderna Museet in conjunction with the opening of a new exhibition, “Jorden - globala förändringar” [The Earth - Global Change]
- 1995 – Speaker at NASA Goddard Space Flight Center Scientific Colloquium Series, on 5 May 1995, Greenbelt, MD. Lecture topic: “Global Monitoring of the Fluctuations of Glaciers”
- 1996 – Participant in AGU-sponsored Conference on Spheres of Influence: Shaping the Future of Earth Systems Sciences Education, 15-17 November 1996, American Geophysical Union Headquarters, Washington, D.C.
- 1999 – Williams, R.S., Jr., 1999, The Earth’s cryosphere and global environmental change: New York, Columbia Earth Institute, Distinguished Lectures on the Global Environment Series, Columbia University, 6 April 1999; includes 20 p. paper prepared for pre-lecture distribution.
- 2000 – Williams, R.S., Jr., 2000, Iceland: Magical land of ice and fire: Lecture presented to the Connecticut Academy of Arts and Sciences, Kline Geology Laboratory, Yale University, New Haven, CT, on 20 September 2000, as part of Iceland’s Millennium Celebration.
- 2000 – Williams, R.S., Jr., 2000, The Earth’s cryosphere and global environmental change: Lecture presented to the Water Resources Division District Office, U.S. Geological Survey, Northborough, MA, on 3 April 2000
- 2001 – Williams, R.S., Jr., 2001, The Earth’s cryosphere and global environmental change: Lecture presented to the Departments of Earth and Geographic Sciences and Environmental, Coastal and Ocean Sciences, University of Massachusetts/Boston Harbor Campus, Boston, MA, on 23 April 2001
- 2002 – Williams, R.S., Jr., 2002, The Earth’s cryosphere and global environmental change: Lecture presented at the U.S. Department of Energy, Jefferson Laboratory, Newport News, VA, on 28 February 2002

- 2002 – Williams, R.S., Jr., 2002, Iceland: Dynamic land of ice and fire: Lecture presented at the U.S. Department of Energy, Jefferson Laboratory, Newport News, VA, on 28 February 2002. Lecture was part of Jefferson Laboratory's Science Education series for the public. The lecture was videotaped for showing on the local educational TV station and for loan to local schools
- 2002 – Williams, R.S., Jr., 2002, The Earth's cryosphere and global environmental change: Two lectures presented to two classes in the Department of Geology, College of William and Mary, Williamsburg, VA, on 1 March 2002
- 2003 – Williams, R.S., Jr., 2003, The Earth's cryosphere and global environmental change. Lecture presented as part of the Environmental Sciences Seminar Series [Co-sponsors: Department of Earth Sciences (Prof. Wallace A. Bothner) and Department of Natural Resources and the Institute for the Study of Earth, Oceans and Space (EOS)] at the University of New Hampshire, Durham, NH, on 17 April 2003
- 2003 – Williams, R.S., Jr., 2003, Iceland: Dynamic land of ice and fire. Lecture presented to Glacial Geology 762/862 (Prof. Joseph M. Licciardi), Department of Earth Sciences, University of New Hampshire, Durham, NH, on 17 April 2003
- 2003 – Williams, R.S., Jr., 2003, Human impact on the planet: An Earth System Science perspective and ethical considerations. Lecture presented to Environmental Geology 409 (Prof. Peter J. Thompson), Department of Earth Sciences, University of New Hampshire, Durham, NH, on 16 April 2003
- 2004 – Williams, R.S. Jr., 2004, The Earth's cryosphere and global environmental change. Lecture presented at the Woods Hole Research Center, Gilman Ordway Campus, 149 Woods Hole Road, Woods Hole, MA 02543, on 15 July 2004
- 2004 – de Blij, H.J., Muller, P.O., and Williams, R.S., Jr., 2004, *Physical Geography. The Global Environment*: New York, Oxford University Press, 702 p. Revised third edition of a textbook on physical geography for undergraduates
- 2005 – Williams, R.S., Jr., 2005, The Earth's cryosphere and global environmental change. Lecture presented at the USGS National Center in the Chief Geologist's Seminar Series, National Center Auditorium, Reston, VA, on 13 December 2005
- 2006 – Williams, R.S., Jr., 2006, The Earth's dynamic cryosphere. Lecture presented at the Woods Hole Oceanographic Institution (WHOI) in the 2006 Geodynamics Seminar Series (AIce@), sponsored by the WHOI Academic Programs Office and WHOI Deep Ocean Exploration Institute, Carriage House, Woods Hole, MA, on 13 April 2006
- 2007 – Williams, R.S., Jr., 2007, Glacier Studies Project. Presentation at USGS National Center for launch of USGS contribution to the International Polar Year: Science at the Ends of the Earth. Included participation in panel discussion. National Center Auditorium, Reston, VA on 30 March 2007)
- 2008 – Williams, R.S., Jr., 2008, Glaciers of Iceland. Lecture presented to the Department of Geosciences, Pennsylvania State University, University Park, PA, on 11 September 2008.
- 2010 – Williams, R.S., Jr., 2010, Climate warming, glaciers, and the rising sea level. Lecture presented at the Stefánsson Arctic Institute and the University of Akureyri, Akureyri, Iceland, on 29 September 2010.

- 2012 – Lecturer (9-10 July) in Unit 2, Wampanoag creation story and geological history of Cape Cod; origin of ancestral homelands from Wampanoag and geological perspectives. Native Youth in Science – Preserving Our Homelands. Summer 2012 science program (pilot) during July and August for Mashpee Wampanoag Tribe (WMT) tribal youths in grades 6, 7, and 8. The program was developed by the MWT and the U.S. Geological Survey (USGS), Woods Hole Coastal and Marine Science Center; it was taught by education and natural-resource staff of the MWT and scientists from the USGS.
- 2013 – Williams, R.S., Jr., 2013, The Earth’s disappearing cryosphere: glaciers, snow cover, floating ice, and permafrost. Invited lecture presented at the 75th Anniversary of the American Polar Society, Woods Hole, MA (at Marine Biological Laboratory auditorium), on 16 April 2013.
- 2013 – Williams, R.S., Jr., 2013, The Earth’s disappearing cryosphere: glaciers, snow cover, floating ice, and permafrost. Invited lecture presented at the auditorium of the Icelandic Meteorological Office, Reykjavik, Iceland, on 3 September 2013.
- 2013 – Williams, R.S., Jr., 2013, The Earth’s disappearing cryosphere: glaciers, snow cover, floating ice, and permafrost. Invited lecture presented at the Fall Lecture series in the Harbourton Auditorium of the Woods Hole Research Center, Falmouth, MA, on 26 September 2013.
- 2013 – Williams, R.S., Jr., 2013, The Earth’s disappearing cryosphere: glaciers, snow cover, floating ice, and permafrost. Invited lecture presented at the Fall Lecture series in the Auditorium of Clark Hall, Department of Environmental Sciences, University of Virginia, Charlottesville, VA, on 3 December 2013.
- 2014 – Williams, R.S., Jr., 2014, The glaciers of Iceland and sea-level rise. Invited lecture presented at the Fall Lecture Series, Auditorium of Clark Hall, Department of Environmental Sciences, University of Virginia, Charlottesville, VA, on 2 December 2014.
- 2014 – Williams, R.S., Jr., 2014, [Illustrated] Field Guide to the Excursion Along the South Coast of Iceland (Reykjavík to Höfn and return to Reykjavík), 13-16 June 2014; Principal field trip leader for the Trustees of the Leifur Eiríksson Foundation and their families, 42 p.
- 2015 – Williams, R.S., Jr., 2015, [Illustrated] Field Guide for An Excursion to Borgarnes, Bifröst, Reykholt, Reykholtsdalur, Hvítá, and Norðlingafljót (Reykjavík to Borgarnes, Bifröst, Reykholt, and Reykholtsdalur, and return to Reykjavík), 24-25 June 2015; Principal field trip leader for the Trustees of the Leifur Eiríksson Foundation and their families, 50 p., with appendix by Kevin P. Smith, *Ore, Fire, Sickle: Iron Production in Viking Age and Early Medieval Iceland* (26-p. Reprint)

### **Memberships and Service in Professional Societies:**

Fellow, Geological Society of America (1962-)

Corresponding (Foreign) Fellow, Icelandic Science Society (1980-)

Fellow, American Association for the Advancement of Science (1965-);

Elected as Member-at-Large of Section E (Geology and Geography) of the American Association for the Advancement of Science, January 1989-February 1993; Elected Chairman, Section E (Geology and Geography) in 1992, February 1993-February 1996; Council Member, 1995-1996; Member, Annual Meeting Program Committee, 998-2000

Member: American Geophysical Union (1969-)

International Glaciological Society (1975-); Appointed to governing Council of the International Glaciological Society, 1983-1984; Elected to the governing Council of the International Glaciological Society, 1984-1987  
Iceland Natural History Society (1975-)  
Iceland Glaciological and Geoscience Society (1975-)  
Surtsey Research Society (1966-)  
Sigma Xi (1962-)  
American Society for Photogrammetry and Remote Sensing (1962-1997); Second Deputy, First Deputy, and Director, Remote Sensing Applications Division, 1976-1979  
Member, American Polar Society (2013-)

### **Service on Scientific Review Panels and Editorships of Scientific Journals:**

- 1972 – Member of NASA-sponsored review panel in geology to review scientific proposals received for ERTS 1 (Landsat 1) experiments (Jan.-Feb. 1972)
- 1975-1991 – Member, Fellowship Review Committee (Geosciences), American-Scandinavian Foundation
- 1976-1977 – Associate Editor, Photogrammetric Engineering and Remote Sensing, Journal of American Society of Photogrammetry
- 1978 – Member, "International Workshop on World Glacier Inventory." UNESCO-, ICSI-, Temporary Technical Secretariat for World Glacier Inventory - Sponsored Workshop held at the Aletsch Ecological Centre, Riederalp, Ct. Valais, Switzerland (17-22 Sept. 1978). Two invited presentations. Paper published in International Association of Hydrological Sciences Publication No. 126, 1980, 351 p.
- 1980 – Member, NASA-sponsored "Workshop on Geological Applications of Thermal Infrared Remote Sensing Techniques, (11-13 February 1980). Invited presentation. Paper included in LPI Technical Report No. 81-06, Lunar and Planetary Institute, Houston, Texas, 1981, 138 p.
- 1980 – Detailed by the Director, USGS, to serve, intermittently, for a two-month period, on a Special Project, Office of Science and Technology Policy, Executive Office of the President, to review declassification of data useful to the earth-science community. Dr. Gordon Law, Assistant and Science Advisor to the Secretary, Department of the Interior, made the written request to the Director, through the Assistant Secretary, Energy and Minerals, on 6 October 1980.
- 1981 – Member, Committee on Glaciology Workshop, Polar Research Board, National Research Council, National Academy of Sciences (14-15 May 1981). Wrote several sections for Chapter 6, Research on Glaciers, and Chapter 7, Other Considerations, of the NRC Book, "Snow and Ice Research. An Assessment" which was published in 1983, as part of the Polar Research Board's Series, "Polar Research - A Strategy"
- 1981 – Selected by the Secretary-General, International Glaciological Society, to be the Senior Scientific Editor of volume 9 (Annals of Glaciology) the proceedings volume for the Second International Symposium on Remote Sensing in Glaciology held in Cambridge, England, in September 1986. (B-5)
- 1981-1983 – OESA representative to the Geological Survey Research Committee. In mid-June 1982 became NMD representative (alternate) to the same committee

- 1982 – Member, OTA-sponsored Workshop on "Remote Sensing: Government User Concerns." Contributor to report: Office of Technology Assessment, 1982, Civilian space policy and applications: Congress of the United States, Office of Technology Assessment, Washington, DC, 391 p.
- 1982 – Member, NASA-NSF-sponsored "Workshop on Antarctic Glaciology and Meteorites." (19-21 April 1982). Invited presentation. Abstract included in LPI Technical Report No. 82-03, Lunar and Planetary Institute, Houston, Texas, 1982, 57 p.
- 1982 – Expert consultant to UNESCO-sponsored "Expert Meeting on Preliminary Glacier Inventories," held at the Temporary Technical Secretariat for World Glacier Inventory, Department of Geography, Swiss Federal Institute of Technology, Zürich, Switzerland (25-27 October 1982). Contributor to the final "Report of the Expert Meeting on Preliminary Glacier Inventories" (1983)
- 1983 – Appointed to the governing Council of the International Glaciological Society and selected by the Council to be the Chairman, Papers Committee, and Chief Scientific Editor for v. 9 of Annals of Glaciology
- 1984-1994 – Member, Evaluation and Selection Committee for the William A. Fischer Memorial Scholarship of the American Society for Photogrammetry and Remote Sensing. The \$1,000 scholarship has been awarded yearly beginning in 1984 for graduate study in remote sensing
- 1984 – Appointed to the Papers Committee for the Symposium on Glacier Mapping and Surveying of the International Glaciological Society, which was held in Reykjavík, Iceland, on 26-29 August 1985. Duties include serving as Associate Scientific Editor for v. 8 of Annals of Glaciology, the proceedings volume of the symposium
- 1984 – Member, Department of Energy-sponsored "Workshop on Land, Ice-Ocean Interactions," held at the Battelle Conference Center, Seattle, Washington (13B15 September 1984). Workshop organized by the Committee on Glaciology, Polar Research Board, National Academy of Sciences/National Research Council-Contributor to the workshop proceedings volume. Contributor to the workshop report published in 1985: "Glaciers, Ice Sheets, and Sea Level: Effects of a CO<sub>2</sub>-Induced Climatic Change."
- 1985 – Member, NASA-sponsored "Workshop-Conference on Global Megageomorphology," held at the Oracle Conference Center, Arizona, (12-17 January 1985). Invited presentation. Panelist for discussion on "Regional Geomorphology from Space." Contributor to the conference proceedings volume, Global Mega-Geomorphology, NASA Conference Publication 2312, which was published in 1985
- 1986 – Associate Scientific Editor, Annals of Glaciology, v. 8, Proceedings of the Symposium on Glacier Mapping and Surveying
- 1986 -2000 – Expert consultant to the World Glacier Monitoring Service (WGMS) for satellite monitoring of glacier fluctuation. WGMS is located at the Swiss Federal Institute of Technology (ETH), Zürich, Switzerland, and is part of the Global Environmental Monitoring System (GEMS); it is funded by UNEP, UNESCO, FAGS/ICSU, and ETH
- 1986-1987 – Appointed Member, Editorial Board of the Annals of Glaciology, International Glaciological Society
- 1986-1987 – Appointed Member, Publications Committee of the International Glaciological Society
- 1987 – Chief Editor, Annals of Glaciology, v. 9, Proceedings of the Second Symposium on Remote Sensing in Glaciology



- 1987-1997 – Appointed Member, Joint Satellite Mapping and Remote Sensing Committee, America Society for Photogrammetry and Remote Sensing/American Congress on Surveying and Mapping
- 1987-1988 – Appointment by the Chief, Office of Regional Geology, to be the USGS representative to NASA's Earth Science Steering Committee on the Geostationary Platform component of the Earth Observing System (EOS)
- 1987-1989 – Appointment by the Chief Geologist to be the Geologic Division's representative on the NASA/USGS Coordinating Committee for Data Management
- 1988-1991 – Appointment by the Director of Education, American Geological Institute, as a Member of the Earth Science Education Framework Steering Committee to improve the earthscience curriculum in grades K-12. A 34-page AGI booklet, "Earth Science Education for the 21st Century: A Planning Guide" was published in 1991
- 1989 – At the invitation of NASA, represented the USGS at the Solid Earth Science Planning Conference, held in Coolfont, West Virginia, 22B28 July 1989. Served on Landforms and Paleoclimate Panel and prepared several documents. More than 100 U.S. and foreign scientists attended the conference, the objective of which was to merge NASA's geology and geodynamics programs
- 1990-1995 – Appointment by the Board of Trustees, National Geographic Society, to be a Member, Committee for Research and Exploration. Review 30 to 50 scientific proposals every two months
- 1990-1994 – Appointment by the Chairman, Committee for Research and Exploration, National Geographic Society, to the Steering Committee for the "Geography of Freshwater Initiative," a major 5-10 year national program launched formally in mid-1992
- 1990 – Member, USGS (GD) - sponsored "Climate Change Workshop," held at Asilomar Conference Center, California (22B26 January 1990). Presented the Solid Earth Processes Science Element of the U.S. Global Change Research Program. (Workshop report never completed by Jennifer Hardin, Workshop convener)
- 1990-1991 – Appointment by the Chairman, Committee for Research and Exploration, National Geographic Society to be a Member, Publications Subcommittee. Responsible for oversight of the interdisciplinary scientific journal, Research and Exploration
- 1990-1993 – USGS Agency and Committee on Earth and Environmental Sciences (CEES) [Federal Coordinating Council on Science, Engineering, and Technology (FCCSET)/Office of Science and Technology Policy (OSTP)], liaison to Working Group on Solid Earth Processes in Global Change, Committee on Global Change (U.S. National Committee for the International Geosphere-Biosphere Programme), National Academy of Sciences
- 1991-2003 – Appointment by the Chairman, Committee for Research and Exploration, National Geographic Society, to be a Member, Assessment Subcommittee. Carry out a preliminary review of approximately 45 scientific proposals every three or four months
- 1991-1995 – Appointment by the Chairman, Committee for Research and Exploration, National Geographic Society, to be Chairman, Publications Subcommittee. Responsible for oversight of the interdisciplinary scientific journal, Research and Exploration and special publications sponsored by the Committee for Research and Exploration

- 1991-1994 – Appointment by the Chairman, Committee for Research and Exploration, National Geographic Society, to be a Member, Geography of Freshwater Program Grants Subcommittee. Responsible for evaluating scientific proposals and helping to develop the national "Geography of Freshwater" research program, including a Memorandum of Understanding between the National Geographic Society (Committee for Research and Exploration) and the U.S. Geological Survey (Water Resources Division) for cooperation in research
- 1991 – Member, Meteorology Peer-Review Panel, U.S. Agency for International Development, U.S. Department of State (24 October 1991). Responsible for evaluation of scientific proposals
- 1991 – Invited Panel Member, "Global Change: How Global and How Much Change?," at ASPRS Tech '91, Monitoring the environment using geographic information systems, remote sensing, and global data bases. One-day technical session sponsored by the American Society for Photogrammetry and Remote Sensing at the USGS National Center on 5 August 1991.
- 1991 – Convenor/Coordinator of Polar Research Program Strategies Workshop held at the USGS National Center on 12B13 November 1991. Twenty-six scientists from GD, NMD, and WRD participated in a review of USGS polar research activities in four topics: Environmental History and Global Change; Geologic Processes, Hazards, and Environmental Indicators; Marine and Continental Geology and Geophysics; and Energy and Mineral Resources. A Final Report of the Workshop was completed in August 1992 and published as USGS Open-File Report 95-0324
- 1991 – Invited participant at OEMG Program Initiative Panel held at the USGS National Center in November 1991. Lead author for presentation on the polar regions
- 1991-1995 – Member, Global Change and Climate History (GC&CH) Program Proposal Review Panel. The GC&CH Program is the Geologic Division's part of the USGS contribution to the 11-federal agency U.S. Global Change Research Program; the panel meets for 2B3 days each year to review continuing and new proposals submitted through the Geologic Division's Ops Plan
- 1992 – Member, Branch of Atlantic Marine Geology (OEMG) Research Promotion Panel (peer-reviewed about 35 scientists)
- 1992 – Invited testifier before the National Assessment of Educational Progress (NAEP) on Geography, Public Hearing at the Holiday Inn Governor's House, Washington, DC on 25 February 1992
- 1992 – Selected by Gary Hill, Chief, OEMG, to serve on an ad hoc committee to recommend to him a major new research program for OEMG that would encompass all branches of the Office. A majority of the Committee selected "Energy Gases" as the primary topic for funding at the \$1 million level. I resigned from the Committee to pursue other topics of interest
- 1992-1996 – Appointment by the Director of Education and Human Resources, American Geological Institute, as a Member of the Advisory Panel for the K-6 Earth Science Sourcebook Program
- 1992-1996 – In December 1992, I was appointed by Ralph J. Cicerone, President, American Geophysical Union, to serve a 3 1/2-year term as a Member, AGU Committee on Global Environmental Change

- 1993 – Member, Branch of Atlantic Marine Geology (OEMG) Research Promotion Panel (peer-reviewed about 35 scientists)
- 1993 – Invited member, Glaciology Panel, Office of Polar Programs, National Science Foundation. Because of Transition Team obligations, I was unable to attend the two-day panel meeting. I did submit written technical reviews of seven proposals to the Panel Chair, Dr. Julie Palais
- 1993-1996 – Appointed to the Advisory Board of an Annenberg/CPB [Corporation for Public Broadcasting] Project to create, with six international partners, a 26-unit, modular "World Regional Geography" telecourse. Videocassettes and accompanying teacher's manual distributed by John Wiley and Sons in 1996
- 1994-1995 – Elected (by peers) Member, Future Studies Team, Office of Energy and Marine Geology, Geologic Division, U.S. Geological Survey
- 1995 – Chairman, Branch of Atlantic Marine Geology (OEMG) Research Promotion Panel (peer-reviewed about 35 scientists)
- 1995-1998 – Appointment by the Geologic Division as one of two Division science advisors to the USGS Global Change Science Advisory Panel
- 1995-2003 – Appointment by the Chairman to be a Vice Chairman, Committee for Research and Exploration, National Geographic Society
- 1995-1998 – Appointment by Program Coordinator, Global Change and Climate History Program (GD), as Member, Program Council to review scientific proposals, allocate program funds, and prepare program prospectus
- 1995 – Expert consultant to UNESCO-sponsored meeting of invited authors of UNESCO book, "Into the 2<sup>nd</sup> century of World glacier monitoring: Prospects and strategies." Co-author with D.K. Hall of book chapter on "Use of remote sensing techniques" (1998, p. 97-111), Swiss Federal Institute of Technology, Zürich, Switzerland (11-15 Oct. 1995)
- 1996 – Member, USGS (GD) - Sponsored "Climate Change and Surficial Processes Regional Workshop," held at USGS National Center, Reston, VA (27-28 March 1996)
- 1996 – Member, USGS (GD) - Sponsored "Climate Change and Surficial Processes Regional Workshop" held at Sheraton West Hotel, Denver, CO (23-24 April 1996)
- 1996 – Invited speaker, North East Map Organization Annual Meeting (6-7 June 1996), Woods Hole Oceanographic Institution, Quissett Campus, Woods Hole, MA: Coastal-change and glaciological maps of Antarctica (7 June 1996)
- 1996-2003 – Appointment by the Chairman to be *ex officio* Member, Assessment Subcommittee; for Mission, for Membership, and for Medals and Awards; and Communications Subcommittees, and *Ad Hoc* Committee for Coral Reef Study, Committee for Research and Exploration, National Geographic Society
- 1996-1997 – Appointment by M. Frank Watt Ireton, Manager, Education Programs, American Geophysical Union, to be a Member, Teachers as Global Environmental Change Resource Agents Project Advisory Board
- 1997 – Chairman, Climate History/Hazards Team Peer-Evaluation Panel (peer-reviewed about 25 scientists in Eastern Region's Climate, Hazards, and Intelligence programs), 14-16 April 1997.
- 1997 – Invited to make presentation on the future of Geologic Division and USGS science programs as a Member, Panel 3, to the Geologic Division Scientific Strategy Team on 8 July 1997. Report, "Summary of Comments to and Background Notes for Panel 3," submitted to the GD Scientific Strategy Team, 19 p.

- 1997 – Submitted a “Critique of the Seven Science Goals of the Scientific Strategy Report [Draft 17 Sep 97] of the Geologic Division,” on 3 October 1997, to Members, Scientific Strategy Team, GD, 5 p. (This was a follow up to my 8 July 1997 presentation and report.)
- 1997 – Member, External Review Committee, Hydrological Sciences Branch, Laboratory for Hydrospheric Processes, Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, MD (16-17 September 1997). Selected by Edwin T. Engman, Chief, Hydrological Sciences Branch. Report prepared by the five-member committee and submitted to NASA
- 1998 – Member, Review Panel, U.S. Geological Survey, Biological Resources Division’s Global Change and Wetlands Ecology programs, Phoenix, AZ (9-13 February 1998). Selected by Jan E. Riffe, Office of Deputy Chief of Science (BRD). Report prepared by seven-member committee and submitted to BRD on 20 April 1998
- 1998 – Member, Panel 4, NASA Astrobiology Institute Program in Washington, DC (6-8 April 1998). Selected by Gerald M. Soffen, NASA Hq, Code S, to evaluate 53 proposals received in response to NASA CAN. Initiation of major new NASA program
- 2001 – Associate Scientific Editor, *Annals of Glaciology*, v. 34 (2002), Proceedings of the 4<sup>th</sup> International Symposium on Remote Sensing in Glaciology, 464 p.
- 2002 – Moderator, Session 18 - Chapter 12, Grand challenges in modeling, observations, and information systems, *in* Strategic plan for the U.S. Climate change science program: Washington, DC, Climate Change Science Program (CCSP) Workshop, 3-5 December 2002, Marriott Wardman Park Hotel, Breakout Group 3: Climate Change Science Program Elements, 4 December 2002
- 2003 – Appointment by George M. Woodwell, Director, Woods Hole Research Center, Woods Hole, MA, as Adjunct Senior Scientist
- 2003 – Appointment by Nicholas Lancaster, Program Coordinator, Earth Surface Dynamics Program, as Member, Program Council, to review scientific proposals and to prepare new 5-year plan
- 2003 – Appointment by Marcus Milling, Executive Director, American Geological Institute, as Member, Advisory Board, AGI High School Environmental Science Textbook Project
- 2003 – Member, National Snow and Ice Data Center-sponsored “Workshop on Assessing Global Glacier Recession,” held in Boulder, Colorado (16-18 March 2003). Invited presentation on 17 March 2003 on “Satellite Image Atlas of Glaciers of the World.” NSIDC is part of the Cooperative Institute for Research in the Environmental Sciences (CIRES) at the University of Colorado
- 2003 – Submission of research proposal to NASA Hq: “Quantification of Surficial, Areal, and Volumetric Changes in Ice Caps in the North Atlantic as an Early Indicator of Regional Climate Change.” Proposal submitted by Dorothy K. Hall (NASA Goddard Space Flight Center) and Richard S. Williams, Jr. (USGS Woods Hole Science Center) on 10 April 2003 in response to EOS Science Data Analysis and Modeling Proposal (NASA Research Announcement 03-0ES-02). [Accepted by NASA as a funded proposal on 8 June 2005]
- 2005-2007 – Selected by the Director, USGS, in July 2005 to be a member of the U.S. Department of the Interior (DOI) National Aeronautics and Space Administration (NASA) interagency committee for the “William T. Pecora Award” presented annually “to recognize the outstanding contributions by individuals or groups to advancing the understanding the Earth by means of remote sensing.”

- 2006 – Selected by the Regional Director, Eastern Region, USGS, in May 2006 to be the ST representative on the National Panel for Promotion of Geologic Discipline Scientists to GS-14, GS-15, or ST. The Panel met in Reston, VA on 26-27 June 2006, to review 33 candidates forwarded by the Regional Panels.
- 2007 – Selected by the Associate Director for Research and Collections, National Museum of Natural History (NMNH), Smithsonian Institution (SI) in March 2007 to be the external ST representative on the NMNH Professional Accomplishments Evaluation Committee (PAEC) to review GS-13, GS-14, GS-15, and SL scientists at the SI's NMNH. The PAEC met in Washington, DC on 10-11 May 2007, to review 21 candidates on the basis of research, collections, dissemination (outreach and education) and professional service.
- 2007 – Selected by the Director, USGS, on 8 May 2007 to be a member of the USGS Global Change Science Advisory Council to advise the Director on new ideas for global change science by the USGS. The Council has 11 members.
- 2007 – Selected by the Chairman of the Board of the Leifur Eiríksson Foundation (LEF), Dr. John T. Casteen, III, President, University of Virginia, to serve on the 3-member Fellowship Review Committee of the LEF. The LEF awards 5-6 \$25,000 fellowships each year to support the studies of U.S. and Icelandic students in the other's countries.
- 2010 – Selected by the Chairman of the Board of the Leifur Eiríksson Foundation (LEF), Dr. John T. Casteen, III, President, University of Virginia, to serve a two-year term (2010-2012) as a member of the of the 5-member Board of the LEF. Two Board meetings are held each year, one in the U.S., the other in Iceland.
- 2012 – Selected by Dr. Teresa A. Sullivan, President, University of Virginia, to serve a four-year term (2012-2016) as a Trustee of the 5-member Board of the LEF. Two Board meetings are held each year, one in the U.S., the other in Iceland.
- 2014 – Selected by Nature McGinn, Office of Polar Programs, National Science Foundation, to serve on Site-Review Panel to evaluate the Polar Geospatial Center, University of Minnesota, on 22-24 September 2014.

### **Scientific and Technical Training Instructor:**

- 1979 – Coordinator and Lecturer for Geological Society of America (Northeastern Section) Short Course, “Remote Sensing Applied to Regional Geological Research”, Hershey, PA.
- 1989 – Co-convenor of Shortcourse No. S24B, Geomorphology from Space, given at the 28<sup>th</sup> International Geological Congress in Washington, D.C. on 15 July 1989. Other co-convenors: Baerbel K. Lucchitta (USGS/ORG) and Victor R. Baker (Univ. Of Arizona)
- 1989 – Co-convenor with Bruce F. Molnia (USGS/OIG) of USGS-sponsored International Workshop on Arctic Geologic Processes and Global Change during the 28<sup>th</sup> International Geological Congress in Washington, D.C. on 16 July 1989

### **Special Assignments:**

- UNESCO, 1971 – As a UNESCO expert consultant, seconded by the USGS Water Resources Division, carried out two weeks of field work in the Canary Islands to analyze thermal infrared imagery (aerial thermography) of coastal areas to delineate submarine spring discharge of freshwater. Final report (35 p.) published in 1972.

USGS - American Society of Photogrammetry, 1981-1983 – In late fall 1981 assigned the responsibility for preparing Chapter 31, Geological Applications, for the second edition of the Manual of Remote Sensing. (Published in August 1983.)

USGS Global Change -1987-1990 – Requested by the Asst. Chief Geologist for Programs in late January 1987 to prepare a comprehensive discussion paper, "The USGS and Global Change," by early March 1987 to review the scope and elements of a bureau-wide program in global change. This led to appointment by the Chief Geologist on 1 October 1987 to be Coordinator for all Global Change Activities in the Division. Established Geologic Division Global Change Advisory Group in early 1989 (11 members from each Office of the division). Deeply involved in development of the Geologic Division's global change research program budget for FY90-96. Also represented the Geologic Division (with Thomas A. Ager) on interdivisional bureau global change research program coordination (development of research program and budget).

U.S. Global Change Research Program-1987-1991 – As Member of Global Change Working Group (Robert W. Corell, NSF, Chairman) of the Committee on Earth and Environmental Sciences (CEES), Federal Coordinating Council for Science, Engineering, and Technology (FCCSET), Office of Science and Technology Policy (OSTP), Executive Office of the President, played a key role in the development of the U.S. Global Change Research Program, including addition of hydrology to the Climate and Hydrologic System interdisciplinary science element and addition of two more science elements, Solid Earth Processes and Solar Influences. Also, served as Science Element Task Leader, Solid Earth Processes Task Group, involving senior representatives from USGS, NASA, NSF, NOAA, and DOA, and as Major Initiatives Program Leader, Sea-Level Change, one of the four integrating themes for FY 1992 in the U.S. Global Change Research Program. Responsible for preparation of Fiscal Year Research Plans in Solid Earth Processes and Sea-Level Change of "Our Changing Planet" of the U.S. Global Change Research Program. Between 1987 and 1989, I was also a Member of the Staff Working Group of the Committee on Earth Sciences (CES, forerunner of CEES).

1993 – Chosen by the Acting Director in August 1993 to be one of 17 members of the Transition Team of the USGS to make formal recommendations regarding the organizational structure and programmatic priorities of the USGS to meet its national responsibilities in the 21st century. The intensive review took place during a nine-week period between 14 Sep and 15 Nov 93 at various locations throughout the U.S. Team report published in November 1993.

1996 - 1999 – Selected by the Director, USGS, to be the USGS Representative to the U.S. Department of State for Antarctic Treaty Consultative Meetings (ATCM). Represented USGS/DOI at ATCM 21 in Christchurch, New Zealand (19-30 May 1997) and ATCM 22 in Tromsø, Norway (25 May-5 June 1998).

### **Miscellaneous Technical Activities:**

MOU-IC-1.0001-1991 - Played the key role in the "Agreement to Amend and Extend" the multidisciplinary Memorandum of Understanding between the U.S. Geological Survey and the Icelandic Council of Science (vice the National Research Council of Iceland) for cooperative research and technical exchange with Icelandic counterpart agencies. The amended MOU was signed by the Director, USGS, on 5 March 1991, extending the cooperation until 1998.

MOU-IC-1.0002-1998 - Played a role in the "Agreement to Amend and Extend" the multidisciplinary Memorandum of Understanding between the U.S. Geological Survey and the Icelandic Research Council concerning scientific and technical cooperation in earth sciences. The amended MOU was signed by the Director, USGS, on 9 April 1998 extending the cooperation until 2007.

MOU-IC-1.0003-2007 - Played a role in the "Agreement to Amend and Extend" the multidisciplinary Memorandum of Understanding between the U.S. Geological Survey and the Icelandic Research Council concerning scientific and technical cooperation in earth sciences. The amended MOU was signed by the Director, USGS, on 12 April 2007 extending the cooperation until 2015.

### **Miscellaneous Internal Reports:**

Transition Team, 1993, The U.S. Geological Survey: Vision for the 21<sup>st</sup> century: U.S. Geological Survey, Reston, VA, 15 November 93, 35 p.

Williams, R.S., Jr., 1993, The U.S. Geological Survey: Opportunities and challenges for the next 100 years: Report sent to the Acting Director, Robert M. Hirsch, and the Acting Associate Director, Bonnie A. McGregor, with a transmittal letter on 1 December 1993, 18 p.

Schaake, J.C., Cayan, D.R., Lettenmaier, D.P. Ruf, C.S., and Williams, R.S., Jr., 1997, Report of the External Review Committee to the Hydrological Sciences Branch, Laboratory for Hydrospheric Processes, Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, MD, 29 p.

Williams, Richards S., Jr., 1997, Geologic Division Scientific Strategy Team Meetings, Summary of Comments to and Background Notes for Panel 3, U.S. Geological Survey, Reston, VA, 8 July 1997, 17 p.

Provided information on glaciers to USGS detailee, Elaine R. Padovani, Office of Science and Technology Policy, for a briefing paper to Vice President Al Gore prior to his one-day visit to Glacier National Park, Montana, in September 1997, to give a major speech on global environmental change:

Glacier Recession as an Indicator of Regional Climate Change: The Glaciers of Glacier National Park and North American: OSTP Briefing Paper, 29 August 1997 (Elaine R. Padovani), 8 p.

I also traveled to Glacier National Park, Montana, in September 1997 to provide technical backup for the Vice President's visit.

- Bedford, B.L., Goforth, W.R., Kimball, S.M., Parsons, D.J., Patten, D.T., Sharitz, R.R., and Williams, R.S., Jr., 1998, Report of the External Review Panel. Global Change and Wetlands Ecology Components of the Ecosystem Program Element, Biological Resources Division, U.S. Geological Survey: 20 April 1998, 28 p.
- 1998 – A memorandum “Past, Present, and Future Cooperative Activities Between the USGS and NASA,” dated 17 March 1998, was sent to Steven R. Bohlen, Associate Chief Geologist for Science, 6 p.
- 2000 – Invited presentation on 12 September 2000, as an ST scientist, Leadership meeting on Scientific Research, 12B14 September 2000, Seymour Marine Discovery Center, University of California at Santa Cruz. “USGS: Current Challenges and Future Opportunities.” 12-page typed document prepared for post-meeting distribution and posting on USGS website.
- 2001 – Memorandum prepared for Robert S. Thompson, Chief Scientist, Earth Surface Processes Team, on 24 May 2001. “Alaska: The Final Frontier” Opportunities for Global-Environmental Change Research and for other Research Programs of the U.S. Geological Survey. 4-page memo. with 4 attachments (additional 14 pages).
- 2002 – Working with Janice G. Goodell, Jane G. Ferrigno, myself, and with guidance from Barbara A. Seekins (NOAA), published 13 1:1,000,000-scale maps as a USGS Open-File Report: Chase T.E., Seekins, B.A., editors, 2002, Marine topography of offshore Antarctica: Clarie Coast to Ross Ice Shelf (130\_E. to 170\_W.): U.S. Geological Survey Open-File Report 02-419, 17 p.
- 2003 – Williams, R.S., Jr., 2003, A plan for a Cryospheric Dynamics Project. An integrated quadradivisional research program under the multiagency climate-change science program. Report prepared for the Coordinator, Earth Surface Dynamics Program and circulated for review and comments by 25 BRD, GD, NMD, WRD, and non-USGS glaciologists, 20 November 2003, 28 p.
- 2005 – Williams, R.S., Jr., 2005, The Earth’s cryosphere and global environmental change: Companion document prepared for 13 December 2005 invited lecture at the Chief Geologist’s Seminar Series, USGS National Center, Reston, VA, 39 p.
- 2007 – Williams, R.S., Jr., 2007, Member Science Panel: the USGS-IPY Connection, U.S. Geological Survey IPY Kickoff Celebration, USGS National Center, Reston, VA; 30 March 2007, 1:00pm-4:00pm. Also made 10 min. invited presentation on the “USGS Glacier Studies Project,” including publications forthcoming during the IPY (2007B2008).

### **Outreach and “Public Understanding of Science” Activities:**

During my scientific career I have endeavored to combine publication and (or) presentation of research results with other activities, especially public understanding of science, that contribute to progress and growth in the geosciences. I have served on various science education committees of the Geological Society of America (PEP), American Geophysical Union, and American Geological Institute. I have been a science fair judge in Virginia and Massachusetts for 11 years; I have been a science fair judge at Falmouth High School and Falmouth Academy every year since 1993; prior to that I was Chief Judge, Earth and Space Sciences Division, Virginia State Science and Engineering Fair. In June 1997, I was elected a Member, Corporation Board, Sea Education Association (Woods Hole, MA). In February 2001, I was appointed to the Steering Committee, Robert C. Seamans



Challenge, to raise funds for the new (3<sup>rd</sup>) sailing school vessel, SSV *Robert C. Seamans*, which was commissioned in June 2001. I completed service to the SEA in 2003 after serving two 3-year terms.

I have given lectures on four cruises across many of the world's oceans under Georgetown University's "World Affairs Program," as an Adjunct Professor. I have published two USGS general interest booklets on glaciers and volcanoes, two interactive CD-ROM's including GeoMedia, a Planetary Maps poster/leaflet, and two USGS Teacher's packets: Volcanoes and Land and People: Finding a Balance. Since 1991, I have worked part-time as a Member (appointed Vice Chairman in 1995), Committee for Research and Exploration, National Geographic Society (NGS). I also work on special projects as needed, such as the special research journal issue, "Environmental Consequences of the Persian Gulf War" and the NGS book, "Restless Earth." Through the NGS, I also serve as a scientific advisor to the JASON Foundation for Education, and participated in JASON VI (Hawaii) and JASON VIII (Yellowstone National Park and Iceland). Participated as expedition scientist (glaciology) at the NGS Headquarters PIN Sites and at two sites in Iceland (Keflavik AB and Eldfell Volcano, Heimaey, Vestmannaeyjar). Played a small role as a consultant in JASON XII (2001) (Hawaii) and in JASON XIII (2001-2002) (Frozen Worlds).

Prior to 1993, I was an acknowledged consultant in the preparation of 34 books, videos, films, CD-ROM's, and maps published by a variety of organizations. The following is a list of 19 more publications that fall under public outreach from 1993 to 2013:

1. U.S. Geological Survey, 1993, GeoMedia 2: Global Environmental Change: CD-ROM published by the U.S. Geological Survey, Reston, VA.
2. Canby, T.Y., 1994, Our changing Earth: Washington, D.C., Book Division, National Geographic Society, 200 p.
3. Gore, Rick, 1995, Living with California's faults: National Geographic, v. 187, no. 4, p.2-35.[Includes double map supplement: The Earth's Fractured Surface (scale – 1:48,000,000) and Living on the Edge (scale - 1:2,380,000).
4. Southwick, C.H., 1996, Global ecology in human perspective: New York, Oxford University Press, 392 p.
5. Inter-Network Media, Inc., 1996, GeoMedia: CD-ROM an interactive, hypermedia prepared under a CRADA with the USGS (combined GeoMedia and GeoMedia 2 into a single CD-ROM).
6. Annenberg (CPB Multimedia Collection, 1996, The power of place. World regional geography: A 26-part telecourse and public television series, Corporation for Public Broadcasting; The Annenberg CPB Project, John Wiley and Sons, Inc. and Cambridge Studios, Inc. (Academic Advisor from the United States; Affiliation: U.S. Geological Survey) [Public broadcasting television stations from six nations cooperated on this project: Australia, France, Japan, The Netherlands, Sweden, and the United States].
7. U.S. Geological Survey, 1997, Volcanoes: Teacher's packet including poster and Teacher's manual for grades 9-12. [<http://www.usgs.gov/education/learnweb/volcano/index.html>]
8. National Geographic Society, 1997, Restless Earth: Washington, D.C., National Geographic Society, 288 p.

9. Andreae, S., Bachman, K., Dyring, A., Dyring, E., Fischer, S., and Roos, J., eds., 1997, *Arktis Antarktis: Museum book for Arctic Antarctic Exhibition*, Bonn, Germany, Kunst- und Ausstellungshalle der Bundesrepublik Deutschland GmbH, 288 p.
10. U.S. Geological Survey, 1998, *Land and people: Finding a balance: Teacher's packet*, including poster and student/teacher's manual for grades 9-12. [<http://www.usgs.gov/education/learnweb/LandPeople>]
11. National Geographic Society, 1998, *GeoKit Dynamic Earth*: Washington, DC, National Geographic Edventures, NGT, Inc. [includes Teacher's Guide (152 p.), 3 National Geographic videos (*Our Dynamic Earth*, *Born of Fire*, *When the Earth Quakes*), 2 National Geographic maps (*World Political/World Physical* and *Earth's Fractured Surface*), 4 National Geographic magazines, class pack of National Geographic magazine articles, 4 color overhead transparencies, student handout/worksheet masters, *Dynamic Earth* trivia cards, and correlations to national standards in geography, mathematics, and science].
12. National Geographic Society, 1998, *Satellite atlas of the world*: Washington, DC, National Geographic Society, 222 p.
13. National Geographic Society, 2000, *Coral world map (scale 1:28,510,000 at the Equator) and Virtual reefscape poster*: Washington, D.C., Cartography by Nietschmann, B.Q., Norris, T.B., Rose, R.S., and Roswell, J.M., GeoMap, Department of Geography, University of California at Berkeley; Williams, R.S., Steele, J., deBlij, H.J., and Nietschmann, B.Q., editors; National Geographic Society, Committee for Research and Exploration, double-sided printing.
14. Johansson, C.E., and others, eds., 2001, *Geodiversitet i nordisk naturvård*: København, Nordisk Ministerråd, 150 p.
15. Nicholson, C.P., 2001, *Volcano!*: Toronto, Kids Can Press, Ltd., 32 p.
16. de Blij, H.J., Muller, P.O., and Williams, R.S., Jr., 2004, *Physical geography. The global environment*: New York, Oxford University Press, 702 p. [Undergraduate textbook for the geosciences and environmental sciences]
17. Science Media Group, 2005, *Climate change. Our global experiment*: Harvard University Museum of Natural History, Harvard-Smithsonian Center for Astrophysics: 25 min. DVD.
18. Piper, Ross, 2009, *Extinct animals: An encyclopedia of species that have disappeared during human history*: Westport, Connecticut, Greenwood Press, 204 p. [ISBN 978-0313349874]
19. National Geographic Society, 2013, *Mapping a World Without Ice Poster (two-sided): If All the Ice Melted (front) and The World at High Water (back)*, insert in a National Geographic Magazine, September 2013, v. 224, no. 3, Cover Photograph of a submerged Statue of Liberty: *Rising Seas. How They are Changing Our Coastlines*, to accompany article on *Rising Seas*, by Tim Folger, Photographs by George Steinmetz, p. 30-59.

### **Grants and Inventions:**

- 1968 – Under a U.S. Air Force Cambridge Research Laboratories - Laboratory Director's Fund grant of \$40,000 for 18 mos., I contracted with Daedalus Enterprises, Inc. for the development and fabrication of a quantitative airborne thermal infrared optical-mechanical scanning radiometer for surveys of volcanic and geothermal areas. The prototype Daedalus "Q" - Scanner was the result of this project. The scanner is on permanent loan to the National Energy Authority of Iceland for cooperative research.
- 1981/1982 – Awarded two \$40,000 grants (\$80,000 for two fiscal years) from NASA's Planetary Science Program to prepare a book, "Geomorphology of the Volcanoes of Iceland and Mars."

### **Non-Scientific Publications:**

- 2006 – Williams, Richie, author, and Leos, Bodvar, illustrator, 2006, There's a bear with a pear! (with a Parent-Teacher Guide by Williams, Beth): West Falmouth, MA, Cape Cod Geographic™, A Phonics Reader, Ages 4-6, 32 p. [ISBN 0-9777100-0-9]
- 2009 – Williams, R.S., Jr., and Williams, Mary Ellen, authors, and Williams, R.S., Jr., Imagrapher®, 2009, The stained glass windows of St. Barnabas Episcopal Church, Falmouth, Cape Cod, Massachusetts: West Falmouth, MA, Cape Cod Geographic™, 32 p. [ISBN 978-0-9777100-1-0 (softcover)]

### **Non-Scientific Publication in Preparation:**

- 2015 – Fellows, O.D., Jr., 2015, Poems for my grandchildren; Williams, Richie, editor: West Falmouth, MA, Cape Cod Geographic™, 50 p. (est.) [ISBN 978-0-977-71002-0 (softcover)]