

## CURRICULUM VITA DAVID WAYNE BEATY

### Business Address

Jet Propulsion Laboratory  
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### EDUCATIONAL BACKGROUND

1980 Ph.D., Geology, California Institute of Technology, Pasadena, CA (see bibliography for thesis).

1975 A.B., Earth Sciences, Dartmouth College, Hanover, NH. Degree conferred summa cum laude with highest distinction.

### EMPLOYMENT HISTORY

1999-Present. Jet Propulsion Laboratory, Pasadena, CA. **Project Manager** (1999-2000), **Project Scientist** (2001-2002), **Program Science Manager** (2002-2006), **Associate Mars Chief Scientist** (2006-2006), **Mars Chief Scientist** (2006-present).

1. **Chief Scientist, Mars Exploration Directorate** (Acting beginning June, 2006; formal appointment April 2007-present). Responsible for providing scientific leadership in 1) the development of Mars exploration strategy, 2) interfacing with the science community in advanced program and mission planning, 3) providing the vision for JPL Mars activities, and ensuring that the Mars strategy is implemented by the missions flown. Manage the interfaces with NASA HQ, the science community, Mars Exploration Program management, the science elements of Mars projects, and industry. Member of the Science&Technology Management Council.
2. **Associate Chief Scientist, Mars Exploration Program** (April, 2006-June, 2006). Continuation of previous duties, along with increased involvement in the roles of the Mars Chief Scientist.
3. **Mars Program Science Manager** (April, 2002-April, 2006). Responsibilities included managing the interface between the Mars science community and the JPL engineers, strategic planning in partnership with the Mars Program Chief Scientist (McCleese) and Lead Scientist at HQ (Garvin then Meyer), representing the program office in international negotiations led by NASA HQ, and managing topical studies within the Mars science office. Served as the informal manager of Mars subsurface exploration, especially as related to subsurface access. After 2004, served as a mentor for the new Planetary Protection manager, Dr. Karen Buxbaum.
4. **Planetary Protection Manager, Mars Program Office** (Apr. 2002-Sept., 2004). Scope included oversight of JPL's compliance with current PP requirements, planning for cross-mission PP issues (specifically including facilities needs), forecasting future PP requirements, and planning and implementing a program to meet future requirements.
5. **Project Scientist, Mars Returned Sample Handling Project** (Sept. 2001-Apr. 2002). Responsible for leading the science planning for the MRSH project. Additionally served as the Acting Deputy Project Manager, and in this role, managed the budget, led most of the daily activity, coordinated project communications (both internal and external).
6. **Program Manager, Mars Program Office** (Apr. 2000-Sept. 2001). Three areas of responsibility:
  - **Planetary Protection**. Responsible for managing a budget of \$3 million per year. Scope includes achieving compliance with current PP requirements, forecasting future PP requirements, and planning and implementing a program that will meet future requirements.
  - **Returned Sample Handling**. Responsible for continued planning for facilities, NEPA compliance, science operations, planetary protection, technology development, and public communications for MRSH pre-project activity. Major roles in building inter-center consensus and in communications with HQ.
  - **Subsurface Exploration**. Responsible for building a consensus around the scientific objectives of exploring

the martian subsurface, then designing a multi-mission set of exploration options that will achieve those objectives. Emphasis has been placed on drilling and geophysics, and the relationship between the two. My efforts have contributed significantly to the radar instrument in 2005 and to serious consideration of a drill in 2007.

7. Project Manager, Mars Returned Sample Handling Project (Nov. 1999-April, 2000). Start-up manager of a project with a planned budget of about \$350 million over 15 years, peak staffing of about 60 people, involvement of three NASA centers (JPL, JSC, and ARC), and national visibility. Project deactivated April 2000 with the announced slippage of MSR.

1988-1999 Chevron Petroleum Technology Company (Chevron Oil Field Research Co. prior to 1992), La Habra, CA. **Research geologist** (1988-1991), **Team Leader** (1991-1995), **Manager** (1995-1999)

Acting Laboratory Director, La Habra Laboratory (1999). June-Oct. 1999, Transition Manager then Acting Lab Director responsible for all operations associated with the closing of the La Habra Laboratory complex (7 major buildings, 477,000 sq. ft. of building space, 110 separate labs, 58 acre site). During this transition, the number of employees declined from about 350 to 15. Successful closure resulted in a gain to Chevron of about \$25 million.

Center of Excellence Manager: Geology, Physical and Chemical Measurements (1997-1999). Served as a member of the Center of Excellence Management Team. My roles were twofold:

1. Managed 100-110 geologists and lab-related employees (mixed earth scientists and engineers). I had responsibility for individual performance planning, interim and final reviews, and performance assessment/salary administration for these employees. In addition, I had responsibility for managing both geology and lab competencies, including strategic staffing, recruiting, transfers in/out, budget management. **Results**. Achieved consistently high employee morale, and a retention rate of 99% over two years. Long-range staffing plans added significant new talent, allowing us to enter new business lines. Established individual development plans for all employees. My work unit reduced team administration cost by 41%, and increased mean billing rates from 71% to 79%, resulting in a profit increase of 76% (#1 performer in company).
2. Led the COEx management team. My role was to manage communications, planning, new hire training, safety and environmental compliance, and internal management processes (e.g. meeting facilitation).

I additionally completed a number of special assignments, including the Web Coordination Team, Health and Wellness study team (1998), Cross-Company Lab Reorganization team (1998-99), Conference room technology team (1999), CPTC Repositioning Team (1999), and Editor, La Habra Commemorative Book.

Products and Services Manager (1995-96). Served as Products and Services Manager (Rock and Fluids Analysis and Interpretation) for six months following the unexpected death of Alan Daly. My responsibility was the Rock and Fluids Products and Services Line. In this position I was responsible for managing the technical output, finances, customer relations, marketing, strategic planning, and internal dynamics of about eight technical teams comprising 60-70 employees.

Geochemistry Team (1992-1997). Team Leader. Led a team of approximately 20 organic and inorganic geochemists. The group was involved in a variety of applications relating to oil field exploration and production. My personal technical effort was directed toward using the chemistry of oilfield waters to address a variety of reservoir management and production problems, including scale precipitation, formation damage, correct interpretation of hydrocarbon saturation, waterflood surveillance, water/rock interactions, and acid stimulation. I additionally made significant progress in designing and deploying a new geochemistry database. I served as the web master for the team.

Isotope geochemistry group (1990-1992). Group Leader, 1991-1992. Led a group of 3 researchers and 6 technicians to research the application of light stable isotope geochemistry to Chevron's exploration and oilfield operations. I was responsible for all inorganic isotope applications, and supervised three technicians. My team designed and built two new extraction lines, maintained and operated two mass

spectrometers, and established new mass spectrometer data reduction standards. Our work was used in support of most major Geology Division programs during this period, such as the major Green River, Beaufort Sea, and Dolomite Geochemistry projects.

Ore deposits group (1988-1993). My primary responsibility was to develop new techniques for locating unexposed ore deposits. Research projects focused on comparative geochemistry and genetic modeling, and for the first two years involved a variety of gold, base metal, and REE deposit types. Beginning in 1990, I focused on Irish-type Zn-Pb-Ag deposits, and participated in the discovery and delineation of the world-class zinc deposit at Lisheen, Ireland. In 1993 Chevron divested its mineral assets in order to concentrate on its core petroleum business. Our efforts at Lisheen resulted in a net gain to Chevron of about \$70 million.

July 1986-July 1988 **Consulting geologist.** My work involved three general aspects. First (50%), I did exploration work for Canyon Resources Corp., Golden, CO. My primary duty was to manage the exploration at Tennessee Pass (CO). I also worked on the Kendall Au deposit (MT) and on the Fernley diatomaceous earth deposit (NV). Second (45%), I did ore deposits research (partly new work, partly completion of old work). This resulted in 21 presentations at professional meetings, 5 talks at research facilities, contributions to 4 field guides, the publication of 5 major papers, and the initiation of one monograph. Third (5%), I designed, implemented, and interpreted oxygen isotope surveys in the Great Basin to support two gold exploration programs.

June 1980-July 1986 Noranda Exploration Inc., Denver, CO. **Geologist, Senior geologist** (promoted 1985). I explored throughout the Rocky Mountains for the following deposit types: Manto, skarn, porphyry Mo, Precambrian stratabound Au, Tertiary epithermal Au (vein and disseminated), and shale-hosted massive sulfide. Managerial and budgetary responsibilities increased from 1 person and \$40,000 to 7 people and \$1.1 million, respectively. As part of this work, I was involved in three discoveries: Tennessee Pass, CO (Au-rich manto deposits); Deer Trail, UT (two polymetallic mantos); Lisbon Valley, UT (sandstone-hosted Cu; 10 million tons of 0.73% Cu). My duties involved geological and alteration mapping, several types of geochemical surveys, geophysics, drilling, planning, budgeting, and directing an applied research program.

Fall-Spring 1975-1980, Summers 1977-1979 **Graduate Teaching Assistant, Graduate Research Assistant,** Caltech. Assisted with courses in general geology, petrology, and geochemistry.

Summers 1975-1976 **Geologist,** Noranda Exploration Inc. Worked on exploration projects involving volcanogenic massive sulfide, sandstone copper, and carbonatite-hosted REE targets.

Summer 1974 **Field geologist,** Instituto Geografico Nacional, Guatemala. Mapped the geology (at 1:25,000) of 130 km<sup>2</sup> of a previously unmapped region in the Guatemalan volcanic highlands.

## **VOLUNTEER UNIVERSITY SERVICE**

### Graduate Thesis Committees

David C. Keith, "Creating forward predictive models of artificial diagenesis during thermally enhanced oil recovery"; Ph.D. Colo. School of Mines, 1995.

Karen Duttweiler Kelley, "Origin and timing of alkaline magmatism and associated gold-telluride mineralization at Cripple Creek, Colorado, Ph.D. Colo. School of Mines, 1997.

Peter K. Blomquist, "Relationship of ore to paleo-cave systems in the Leadville Dolomite, Central Colorado"; M.S. Colorado School of Mines, 1993.

Ralph J. Stegen, "Geology and origin of the replacement deposits in the Smuggler mine, Aspen, Colorado"; M.S. Colorado State University, 1988.

John F. Hall, "Paleokarst and other dissolution features of the Devonian Dyer Dolomite and Mississippian Leadville Limestone, Central Colorado"; M.S. Colo. School of Mines, 1987.

### Guest Lectures

1980-Present. Have lectured widely, including at Brown University, University of Southern California, Johnson Space Center, Ames Research Center, Colorado School of Mines, Colorado State University, University of Colorado, University of Texas (Austin), University of California (Davis), University of Cincinnati, Lawrence Livermore National Laboratory, U.S. Geological Survey (Reston), the Lamont-Doherty Geological Observatory, and the Irish Geological Survey (Dublin),.

### Courses Taught

1984-1988 "A total concept of the mining industry" at Colorado School of Mines.  
2008 Academy of Program/Project & Engineering Leadership (APPEL); Course Name: Principal Investigator Team Forum #1; Course Dates & Location: August 4-7, 2008, Annapolis, Maryland

### Positions Held

Colorado School of Mines, Adjunct Assistant Professor, 1987-1989; Adjunct Associate Professor, 1989-Present. Colorado State University, Affiliate Professor, 1984-Present.

## **PROFESSIONAL SOCIETIES AND SERVICE**

### Geological Society of America:

*Membership:* 1978-1989 Member; 1989-present Fellow.

May 5-6, 1987, and again Nov. 4-5, 1988: Prepared and led the GSA-sponsored field trip "Geology and Mineral Resources of Central Colorado" (with J.C. Reed, Jr. and B. Bryant)

### Society of Economic Geologists:

*Membership:* 1975-1980 Student Member; 1980-1986 Associate Member; 1986-1989 Member; 1990-present Fellow; 1991 elected Lifetime Member of SEG Pubco.

1994: Chairman, Nominating committee.

1994-1996: Member of SEG Council.

1990-1994: Member of the Editorial Board for the journal Economic Geology. Commended 1992 as one of the top Associate Editors.

1990: Senior editor, "Carbonate-hosted sulfide deposits of the central Colorado Mineral Belt", (Economic Geology Monograph 7, 424 p.).

1988: Led the SEG-sponsored field trip "Geology and Mineralization of the Gilman-Leadville area, Colorado" (with T.B. Thompson; Soc. Econ. Geol. Guidebook Series, V. 2, 126 p.)

Mineralogical Society of America: Past member.

American Geophysical Union: Past member.

Geochemical Society: Past member.

American Association of Petroleum Geologists: Past member.

## **HONORS AND AWARDS**

- July, 2008. NASA Exceptional Achievement Medal. "For exceptional achievement in developing a consensus strategy for the next decade of Mars exploration".
- April, 2009. NASA Group Achievement Award. "For exceptional multinational collaboration in planning a potential international Mars Sample Return mission." From the nomination letter: "The International Mars Architecture for the Return of Samples (iMARS) team produced, in only 10 months, a consensus international plan for the first-ever Mars sample return mission. The iMARS team met only three times, but arrived at the consensus plan by leveraging hours of outside analyses from the participating organizations, using remote collaboration tools, and adopting a highly effective compromise-oriented approach. Achieving such multilateral consensus in such a short time was possible only because of the skill, dedication and tenacity of the iMARS team members. NASA has greatly benefited from having this foundation of international cooperation and support in developing plans for the future of the Mars Exploration Program and perhaps the most challenging and exciting mission in the planetary exploration queue."

## **FOREIGN LANGUAGES**

Reading knowledge of French and Spanish.

## **COMMUNITY VOLUNTEER WORK**

### **Primary Education**

- Rolling Hills Elementary School, Fullerton, CA: School Site Council 1990-1992 (held one of four parent elective positions in a school of 550 students), President 1991-1992.
- Volunteer science teacher, Grades K-5; Science Fair judge, Grades 7-8.

### **Youth Athletics**

- Fullerton Rangers Youth Soccer Club: Assistant coach 1989, Head coach 1990-1995.
- American Softball Association: Manager, Head coach, Board member, 1990-2006.
- Golden Hills Little League: Manager 1991-1994.
- National Junior Basketball League: Coach 1994-1999.

May 1, 2010

## BIBLIOGRAPHY

### Dissertation

**Beaty, D.W.**, 1980, Part I. Comparative petrology of the Apollo 11 mare basalts. Part II. The oxygen isotope geochemistry of the Abitibi greenstone belt: Unpub. Ph.D. thesis, California Inst. of Technology, 463 p.

### Publications

- Beaty, D.W.**, Dymek, R.F. and Albee, A.L., 1977, Petrographic investigation of 10003, the oldest mare basalt (abs.): Lunar Science VIII, p. 79-81. The Lunar Science Institute, Houston, Texas.
- Albee, A.L., **Beaty, D.W.**, Chodos, A.A., Quick, J.E., 1977, Quantitative measurement of petrographic properties by computer-controlled energy-dispersive analysis (abs.): Geol. Soc. Amer. Abs. w. Progs., v. 9, p. 874.
- Beaty, D.W.** and Albee, A.L., 1978, A textural, modal, and chemical classification of the Apollo 11 low-K basalts (abs.): Lunar and Planetary Science IX, p. 58-60. The Lunar and Planetary Institute, Houston, Texas.
- Beaty, D.W.** and Albee, A.L., 1978, Comparative petrology of the Apollo 11 high-K basalts (abs.): Lunar and Planetary Science IX, p. 61-63. The Lunar and Planetary Inst., Houston, Texas.
- Beaty, D.W.** and Albee, A.L., 1978, Comparative petrology and possible genetic relations among the Apollo 11 basalts: Proc. Lunar Sci. Conf. 9th, p. 359-463.
- Beaty, D.W.** and Albee, A.L., 1979, Silica solid solution in natural plagioclase (abs.): EOS Trans. Amer. Geophys. Union, v. 60, p. 415.
- Beaty, D.W.**, Hill, S.M.R. and Albee, A.L., 1979, Low-K basaltic fragments from Apollo 11 soils (abs.): Lunar and Planetary Science X, p. 86-88. The Lunar and Planetary Institute, Houston, Texas.
- Beaty, D.W.**, Hill, S.M.R., Albee, A.L. and Baldrige, W.S., 1979, Apollo 12 feldspathic basalts 12031, 12038 and 12072: Petrology, comparison and interpretations (abs.): Lunar and Planetary Science X, p. 115-139. The Lunar and Planetary Institute, Houston, Texas.
- Beaty, D.W.**, Hill, S.M.R. and Albee, A.L., 1979, Petrology of a new rock type from Apollo 11: Group D basalts (abs.): Lunar and Planetary Science X, p. 89-91. The Lunar and Planetary Institute, Houston, Texas.
- Baldrige, W.S., **Beaty, D.W.**, Hill, S.M.R. and Albee, A.L., 1979, The petrology of the Apollo 12 pigeonite basalt suite: Proc. Lunar Sci. Conf. 10th, p. 141-179.
- Beaty, D.W.**, Hill, S.M.R. and Albee, A.L., 1979, Comparative petrology and significance of the Apollo 11 high-K vitrophyres (abs.): Lunar and Planetary Science X, p. 83-85. The Lunar and Planetary Science Institute, Houston, Texas.
- Beaty, D.W.**, Hill, S.M.R., Albee, A.L., M.-S. Ma and Schmitt, R.A., 1979, The petrology and chemistry of basaltic fragments from the Apollo 11 soil, Part I: Proc. Lunar Sci. Conf. 10th, p. 41-75.
- Beaty, D.W.** and Taylor, H.P., Jr., 1979, Oxygen isotope geochemistry of the Abitibi greenstone belt, Ontario: Evidence for seawater/rock interaction and implications regarding the isotopic composition and evolution of the ocean and oceanic crust (abs.): Geol. Soc. Amer. Abs. w. Progs., v. 11, p. 386.
- Albee, A.L., **Beaty, D.W.**, Chodos, A.A. and Quick, J.E., 1980, Quantitative analysis of petrographic properties and of mineral compositions with a computer-controlled energy-dispersive system: Trans. 8th International Cong. on X-Ray Optics and Microanalysis, D.R. Beaman, ed., Pendell Publishing Company, p. 526-537.
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- Beaty, D.W.** and Albee, A.L., 1980, Silica solid solution and zoning in natural plagioclase: Am. Mineralogist, v. 65, p. 63-74.
- Hill, S.M.R., **Beaty, D.W.** and Albee, A.L., 1980, Petrology of two Luna 24 samples: 24067,3200 and 24067,3600 (abs.): Lunar and Planetary Science XI, p. 447-449. The Lunar and Planetary Institute, Houston.
- Beaty, D.W.** and Albee, A.L., 1980, Petrology of a pyroxenite xenolith in mare basalt 10050 (abs.): Lunar and Planetary Science XI, p. 67-69. The Lunar and Planetary Institute, Houston.
- Beaty, D.W.** and Albee, A.L., 1980, The petrography of basaltic fragments in Apollo 11 drive tubes 10004 and 10005 (abs.): Lunar and Planetary Science XI, p. 64-66.
- Beaty D.W.** and Taylor, H.P., Jr., 1980, The oxygen isotope geochemistry of the Kidd Creek mine: Evidence for a high-<sup>18</sup>O ore-forming solution and implications regarding the genesis of volcanogenic massive sulfide

- deposits (abs.): Geol. Soc. Amer. Abs. w. Progs., v. 12, 384.
- Beaty, D.W. and Taylor, H.P., Jr., 1980, Early crustal hydrothermal processes and the  $^{18}\text{O}/^{16}\text{O}$  evolution of seawater: Evidence from the Amulet mine (abs.): EOS Trans. Amer. Geophys. Union, v. 61, p. 386.
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- Beaty, D.W.** and Cunningham, C.G., 1984, Igneous-related hydrothermal origin of the Deer Trail Pb-Zn-Ag-Au-Cu manto deposits, Marysvale, Utah (abs.): Geol. Soc. Amer. Abs. w. Progs., v. 16, p. 440-441.
- Beaty, D.W.**, Saunders, D.M., Landis, G.P., Naeser, C.W., and Tschauder, R.J., 1985, Two episodes of sulfide deposition in paleo-caves in the Leadville Dolomite at Red Cliff, Colorado: in 1985 SEPM Midyear Meeting Field Guides (De Voto, R.H., ed.), p. 6-127 to 6-136. The Society of Economic Paleontologists and Mineralogists; Denver, Colorado.
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Manuscripts in preparation

**Beaty, D.W.** and Taylor, H.P., Jr., The oxygen isotope geochemistry of the Abitibi greenstone-granite terrane: Implications regarding the evolution of the ocean and oceanic crust. (51p. manuscript to be submitted to Geochim. Cosmochim. Acta.).

Bakke, E.L., **Beaty, D.W.**, and Hayes, J.M., in prep., The effect of different CO<sub>2</sub> ion correction methodologies on  $\delta^{18}\text{O}$  and  $\delta^{13}\text{C}$  results: to be submitted to Isotope Geoscience.

### Other Professional Accomplishments

1989: Led the field trip: "Mineral Deposits and Geology of Central Colorado" (with B. Bryant and T.B. Thompson), sponsored by the International Geological Congress (I.G.C. Field Trip Guidebook T129, 73 p.)

1985: Led the field trip: "Sedimentology, dolomitization, karstification, and mineralization of the Leadville Limestone (Miss.), Central Colo." (with R.H. De Voto), sponsored by S.E.P.M.