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Dept. of Geosciences
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Full Professor
Supervisor, Cybermapping Laboratory
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EDUCATION

B.S., Geology, University of Washington, 1965
M.S., Geological Sciences, University of Washington, 1970
Ph.D., Geosciences, University of Arizona, 1976
Aiken, C.L.V., 1976, The analysis of the gravity anomalies of Arizona, : Tucson, University of. Arizona, Ph.D. dissertation, 127 p

FIELDS OF INTEREST

Applied gravimetric, magnetic, and electrical methods in exploration for minerals, hydrocarbons, geothermal resources, environmental geotechnical studies; Global Positioning System (GPS) ,Geographic Information System (GIS) and digital cameras and reflectorless laser rangefinders and their application to 3D virtual modeling..

ACADEMIC EXPERIENCE

1989-	Professor, Programs in Geosciences, The University of Texas at Dallas
1981-1989	Associate Professor, Programs in Geosciences, The University of Texas at Dallas
1978-1981	Assistant Professor, Programs in Geosciences, The University of Texas at Dallas
1976-1978	Assistant Professor, Department of Geology, Texas Christian University
1975-1976	Instructor, Department of Geology, Texas Christian University
1969-1975	Teaching and Research Associate, Laboratory of Geophysics, University of Arizona
1968-1969	Research Assistant, Seismology Laboratory, University of Nevada-Reno
1965-1968	Assistant Seismologist and Assistant to Seismologist, Seismology Laboratory, University of Washington

OTHER PROFESSIONAL EXPERIENCE

2006-present	Principle Investigator: INTERFACE: Facility for Digital Geosciences
2004	Instructor, 3D Laser scanning and virtual photorealistic outcrops: acquisition, visualization and analysis, two day short course, 2004 AAPG Convention, Richardson, TX.
2004	Instructor, Scanners, Digital Cameras and 3D Models, Texas Society of Professional Surveyors, one day Short Course, San Antonio, TX.
2003-2004	Registered Professional Geophysicist, State of Texas
2003	Instructor, Seminar (1 day) ExxonMobil Upstream Research Co., Digital geologic acquisition visualization and analysis, Houston, TX
2003	Instructor, short course, Digital data acquisition, Univ. of Idaho, Moscow, Idaho.
2003	Instructor, short course/demo, Digital data acquisition, San Diego State University, Mesa, California
2002	Supervisor, Cybermapping Laboratory.
2000	Instructor, short course (10 days), Norsk Hydro ASA, Bergen, Norway, Digital geologic acquisition, visualization and analysis

- 2000 Instructor, Seminar (1 day) ExxonMobil Upstream Research Co., Digital geologic acquisition visualization and analysis, Houston, TX
- 2000 Instructor, (2 days) Geological Society of America Short Course, Digital Mapping Methods: Accurate Digital Data Capture and Analysis for the Field Geoscientist, Reno, NV
- 1999 Co-instructor, (2 days) Geological Society of America Short Course, Digital Mapping Methods: Accurate Digital Data Capture and Analysis for the Field Geoscientist, Denver CO.
- 1997 Louisiana Society of Professional Surveyors., LSPS Annual Convention, Lafayette, La., Short Course on "Geoidal Corrections in Surveying", 1997
- 1997 Geophysical consultant, Hunt Oil
- 1997 GPS consultant, Tarrant County 911 District
- 1993 Navtech Training Courses on differential GPS and high accuracy GPS.
- 1992-95 Consultant, U. S. Geological Survey; GPS Processing of Kinematic GPS Surveys, National Mapping Division.
- 1992 Consultant, Kinematic GPS Surveys, Red River Valley, for U. S. Corps of Engineers.
- 1991-1992 Member, Steering Committee on Surveying, Deformation, Subsidence and Monitoring on Superconducting Super Collider for PB/MK TEAM, SSC engineering contractors.
- 1991 Consultant, Nevada Bureau of Mines and Geology, GPS Processing of Las Vegas Basin Subsidence Study.
- 1988 GPS Training and Advanced Training Seminar, Trimble Navigation, Sunnyvale, CA.
- 1988 UNAVCO GPS Training Seminar, Scripps Institution of Oceanography, LaJolla, CA.
- 1982-1985 Faculty member Summer of Applied Geophysical Experience, Institute of Geophysics and Planetary Physics, University of California
- 1976-94 Consultant, Los Alamos National Laboratory
- 1970- Independent geophysical contractor, geophysicist and consultant to numerous mining, oil, geothermal, geotechnical, and geophysical companies
- 1968-1969 Geophysicist, Utah Construction and Mining Co., Reno, Nevada
- 1969 Geologist, Slope Indicator Co., Seattle, Washington
- 1966 Geologist, Standard Oil of California, Bakersfield, California
- 1963 Marine drilling observer, Washington State Oil & Gas Commission, Olympia, Washington

PROFESSIONAL SOCIETIES

Society of Exploration Geophysicists
 American Geophysical Union
 Institute of Navigation
 Dallas Geophysical Society
 American Association of Petroleum Geologists
 Geological Society of America

AWARDS

Frank Kottowski Memorial Award (best paper), 2002, American Association of Petroleum Geologists Annual meeting-- Janok P. Bhattacharya Carlos V. Aiken, Rucsandra M. Corbeanu, George A. McMechan. Xueming Xu and Xiaoxian Zeng, all with the University of Texas at Dallas; and Christopher D. White, with Louisiana State University, Baton Rouge, La., for "3-D Outcrop Reservoir Characterization")

Best Presentation Award: 2003: The use of ground-based laser scanners, GPS and digital cameras to rapidly create 3D virtual models, September, Institute of Navigation-Global Positioning System

17th Annual South Central Arc User Group (SCAUG) Student Competition Award, Alfarhan, Mohammed, and Aiken , Carlos , 2007, Real Time Integration Of Laser Rangefinders And Arcgis To Capture 3d Geology Features, 17th Annual South Central Arc User Group (SCAUG) Conference, 11-13 April 2007, New Orleans, Louisiana

Dr. R.M. Butler Memorial Best Paper Presented at the CIPC 2009 Award, First Runner Up, LiDAR Technology as a Means fo Improving Geologic, Geophysical and Reservoir Engineering Evaluations: From Rocks to Realistic Fluid Flow Models, M Alfarhan, Deng, L.S., Meyer, R., Oldow, J.S., Krause, F., Aiken, C.L. and Aguilera, R.

PATENT

C. Aiken and X. Xu (co-inventors), 2003, Method and Apparatus for 3D Feature Mapping

SCREEN CREDIT

Category 7: End of the World, Carlos Aiken and Xueming Xu, special effects modeling; Mt. Rushmore scenes and special effects, CBS TV mini series, Los Angeles, CA (November, 2005)

COURSES TAUGHT AT THE UNIVERSITY OF TEXAS AT DALLASGraduate

Digital Geology Workshop
 Geophysical Techniques I
 Global Gravity
 Geologic Computing for Geoscientists
 Exploration Gravity
 Regional Gravity
 Survey of Exploration Geophysical Methods
 Exploration Magnetism
 Graduate Seminars
 Physics of Earth's Interior
 GPS Satellite Surveying Techniques
 Satellite Geodesy and Geodynamics
 GIS Applications to Geosciences
 Field Geodesy
 Digital Geological Data Acquisition in the Field
 GIS Data Acquisition in the Field
 3D Data Capture and Ground LIDAR
 Cybermapping and Close Range Photogrammetry I and II

Undergraduate

Physics of the Earth's Interior
 Field Geophysics
 Geophysics Field Course
 Undergraduate Research
 Oceans
 Earthquakes and Volcanoes

UNIVERSITY ACTIVITIES

Member Search Committee, Green Geophysics Professorship, 1984-1988
 Member Search Committee, Carbonate Professor, 1984
 Chairman, Geophysics Exhibit Committee, 1987;1989
 Chairman, Curriculum Committee, Geosciences Program, UTD, 1983
 Undergraduate Advisor, Programs in Geosciences, University of Texas at Dallas, 1982-1985
 Chairman, Library Committee, University of Texas at Dallas, 1981-1988
 Several Graduate Advisory Committees, Southern Methodist University
 Ad hoc committee Chairman, three committees; ad hoc member, one committee.
 Admissions Committee, Geosciences, 1988-
 Remote Sensing Study Committee, Chairman, 1988
 Geosciences Management Committee, 1994
 Geosciences Curriculum Committee, 1994-2000
 Geosciences Graduate Advisor, 1997-2000
 Geographic Information Sciences MS Committee, 1997-
 Parking and Safety Committee, 1997-2000
 Search Committee, Seismology position, 1998-1999

Vice-Chairman, G.I.S. Coordinating Committee 1998-
 Member, GIS Position Search Committee, Social Sciences, 1999
 University Scholarship Committee, 2000-2003
 Dept. Seminar chairman 2003-2004
 Dept. Seminar chairman 2006-2009
 Dept. Undergraduate advisor, 2008-
 Clark Lecture Tours on 3D Virtual Geology 2006-
 Scholar Days Presentation on 3D Virtual Geology for NS&M 2006-
 Faculty Advisor for student GeoClub 2009-
 Faculty Advisor for student ASH Society 2007-

PROFESSIONAL ACTIVITIES

Member, Editorial Subcommittee, S.E.G./U.S.G.S. Gravity Anomaly Map of U.S., 1976-1985.
 Founding faculty member, Summer of Applied Geophysical Experience (SAGE), Institute of Geophysics and Planetary Physics Los Alamos National Laboratory of the University of California, 1982-1985.
 Member, Committee on Geophysics in Groundwater and Engineering, Society of Exploration Geophysicists, 1979-1983
 Member, Working Group, Gravity Anomaly Map of North America Committee, I.U.G.G., 1985-1988
 Member, Committee on Gravity Prediction, International Association of Geodesy, 1979-1982
 Session Chairman, Los Alamos National Lab. Symposium on Hot Dry Rock Exploration, June, 1982
 Session Chairman, Use of regional gravity and aeromagnetic maps, Society of Exploration Geophysicists, 52nd International Society of Exploration Geophysicists, Dallas, Texas, October, 1982
 Organizer and Chairman, Symposium on Geophysical Crustal Studies of Southern Midcontinent Region, at South-Central Geological Soc. Amer. Meeting, March, 1984.
 Member, Technical Program Committee, Mining, Geotherm and Geophysics, Soc. Explor. Geophysics Meeting, Dallas, Texas, 1989
 Team Leader, leveling and positioning, Greenland Big G Experiment, 1987
 Deputy Team Leader, Antarctic Non-Newtonian Gravity Experiment, 1989
 Member, Technical Program Committee, Society Exploration Geophysicists Meeting, Dallas, Texas, 1989
 Representative, University NAVSTAR Consortium, 1989-present
 Member, The University of Texas System GPS Coordinating Committee, 1990-present.
 Chairman, Technical Subcommittee on Non-Seismic Methods, Society of Exploration Geophysicists International Meeting, 1992.
 Organizer, Special Session on "GPS Positioning in Geophysics", SEG Meeting, 1992.
 Co-organizer, "Advances in Gravity Field Determination for Geodesy and Geophysics", American Geophysical Union Chapman Conference, 1993.
 Member, Gravity and Magnetism Committee, Society of Exploration Geophysicists, 1992-2001.
 Editorial Board, GPS Solutions, 1997-.
 Representative, GOCAD Consortium, 1999-
 Chairman, INTERFACE (INTERdisciplinary alliance for digital Field data ACquisition and Exploration), NSF initiative.
 Licensed Professional Geoscientist #4440, Texas Board of Professional Geoscientists, 2003-4
 Site visit committee member for Canadian Natural Science and Engineering Research Council Strategic Network Grant application titled "Geodetic Canadian Hazards And Risks Monitoring (gCHARM) Network, in Calgary, Canada, 2007

REFEREE

National Science Foundation
 Petroleum Research Fund
 Geophysics
 Geofisica Internacional
 Geophysical Research Letters
 Geological Society of America
 Journal of Geophysical Research
 Boletín de Instituto de Geología
 Southeastern Geology
 Geology

G. K. Gilbert Fellowship Program, U. S. Geological Survey
 U. S. Geological Survey
 Journal of South America Geology
 GPS Solutions
 Journal of African Geology
 Oak Ridge Labs Fellowships

THESES AND DISSERTATIONS COMPLETED

- R. Felch, M.S. (T.C.U.), 1979, A three dimensional gravity model of basin structure, Yucca Flat, Nevada.
 S. K. Western, M.S. (T.C.U.), 1980, The interdependence of gravity anomalies with topography in Chihuahua, Mexico, southern New Mexico and west Texas.
 M. R. Hong, Ph.D., 1982, The Inversion of Magnetic and Gravity Anomalies and the Depth to Curie Isotherm.
 W. D. Kennedy, M.S., 1982, Geophysical Studies of the Southern Albuquerque Basin of the Rio Grande Rift, New Mexico.
 S. F. Lai, Ph.D., 1984, Generalized Linear Inversion of 2.5-Dimensional Gravity and Magnetic Anomalies.
 K. Mickus, M.S., 1985, A controlled source audiomagnetotelluric survey as part of an integrated geophysical study of the Richmond Basin, Virginia.
 S. H. Schaps, M.S., 1985, A gravity/seismic interpretation of Cretaceous features within the central portion of the National Petroleum Reserve, Alaska.
 S. Lee, M.S., 1986, Phase field imaging of 2-D resistivity distributions from electromagnetic data.
 C.-T. Yang, M.S., 1986, The magnetoelectric phenomenon reviewed and evaluated as an exploration tool to detect hydrocarbon accumulation.
 B. A. Lasley, M.S., 1987, A microgravity study of the structural relationships of Penitentiary and Carbon Thrust Faults, Krebs Quadrangle, Oklahoma.
 R. W. Schellhorn, M.S., 1987, Bouguer gravity anomalies and crustal structure of northern Mexico.
 B. C. Ragland, M.S., 1988, Gravity study of a portion of the central zone, Ouachita Overthrust, Oklahoma and Arkansas.
 R. C. Hunt, M.S., 1992, A gravity/magnetic investigation of the crustal structure of South Texas/Northeastern Mexico: in general on the Mesozoic Tectonics.
 T. C. Stallings, M.S., 1994, Establishing a geophysical and geological GIS database of Mexico and demonstrating GIS as a relational tool for interpretation.
 M. Balde, Ph.D., 1994, Vertical control by GPS satellite surveying techniques and high resolution geoid computation: Applications in high accuracy mapping and geophysical data acquisition.
 Hunter-Huston, Holly, M.S., 1996, An integrated 3-D gravity and seismic study of the Ouachita Frontal Thrust Belt, Pittsburg and Latimer Counties, Oklahoma.
 Lyman, Gregory D., 1997, Terrain mapping by reflectorless laser rangefinding systems for inner zone terrain corrections
 Xu, Xueming, PhD, 2000, 3D Virtual Geology; photorealistic outcrops and their acquisition, visualization and analysis, PhD diss..
 Akingbade A. Akinfenwa, MS GIS, 2005, Extraction of 3D data by several methods for the building of a 3D model in ARCGIS: Laser Scanning, direct laser rangefinder measurements and Pictometry, MSGIS project, UTDallas.
 Stephen F. Meigs Jr, MS GIS, 2006, Three-Dimensional Subsurface Modeling Utilizing Petra Software.
 Anne Hayden Covault, MS, 2006, Structural Architecture and Deformation of the Salina Creek Tunnel Normal Fault. MS thesis, UT-Dallas
 John Thurmond, PhD, 2006, Applications Of Three-Dimensional Mapping In Sedimentology: Collection, Visualization, And Interpretation., UT-Dallas diss.
 M. Iulia Olariu, PhD, 2007, Development And Testing Of Methods For Analyzing High Resolution 3-D Digital Outcrop Geology: Big Rock Quarry, Arkansas, 119p
 Mohammed Saad Alfarhan, 2010, GEOSCIENCES INFORMATION SYSTEM (GeoIS): A GEOSPATIAL PARADIGM FOR REAL AND VIRTUAL 3D WORLDS, 139p
 White, Lionel S., 2010,

REFEREED PUBLICATIONS

- Best fit for a plane, with J. R. Sturgul. *Journal of International Association of Math. Geol.*, v. 2, no. 3, p. 34-45, 1970.
 An integrated data base management and analysis system for gravity, with J. S. Schmidt and J. S. Sumner. *11th Symposium on Computer Applications in the Mineral Industry*, v. ii, p. 84-95, 1973.

- Physical and computer modeling of induced polarization, with D. A. Hastings and J. R. Sturgul. *Geophysical Prospecting*, v. 21, p. 763-782, 1973.
- Gravity and aeromagnetic anomalies of southeastern Arizona. *New Mexico Geological Society Guidebook*, 29th Field Conference, Land of Cochise, p. 301-314, 1978.
- Regional geophysical study of Chihuahua City area, Mexico, with D. Garvey, G. R. Keller, P. C. Goodell, M. de la Fuente), *in* AAPG Studies in Geology, No. 13, uranium in volcanic and volcanoclastic rocks (P. Goodell, ed.). *American Assoc. Petrol. Geol.* p. 311-328, 1981.
- A regional strategy for geothermal exploration with emphasis on gravity and magnetotellurics, with M. E. Ander. *Journal of Volcanology and Geothermal Research*, v. 8, p. 1-27, 1981.
- Regional gravity and magnetic study of West Texas, with G. R. Keller, R. A. Smith and W. J. Hinze, *in* Utility of Regional Gravity and Magnetic Anomaly Maps, (W.J. Hinze, ed.). *Society of Exploration Geophysicists*, p. 178-213, 1985, (invited).
- The Magnetoelectric phenomenon reviewed and evaluated as an exploration tool to detect hydrocarbon accumulations, with C. T. Yang and C. Lambert, *in* Unconventional Methods in Exploration for Petroleum and Natural Gas IV, (M. Davidson, ed.), Institute for the Study of Earth and Man, Southern Methodist University, p. 63-106, 1986.
- Phase-field Imaging: The Electromagnetic Equivalent to Seismic Migration, with S. Lee and G. A. McMechan. *Geophysics*, v. 53, p. 231-245, 1988.
- Models of the Bouguer Gravity and Geologic Structure at Yucca Flat, Nevada, with J. F. Ferguson, R. Felch, J. S. Oldow, and H. Dockery. *Geophysics*, v. 53, p. 231-245, 1988.
- Gravity and Magnetic Study of the Triassic Richmond Basin, Virginia, with K. Mickus, W. Peeples, and D. Ziegler, *in* Continental Breakup and origin of the Atlantic Passive Margins, Chapter 16, W. Manspeiser (ed.), Elsevier Publ. Co., Netherlands, Ch. 16, p. 401-421, 1988.
- Comments on "Crustal structure from the three-dimensional modeling of a metamorphic core complex: A model for uplift, Santa Catalina-Rincon Mountains, Arizona", *Geology*, 1987.
- Discussion: Phase-field imaging: The electromagnetic equivalent of seismic migration, with S. Lee, G. A. McMechan, *Geophysics*, v. 53, p. 863, 1988.
- Test of the Newton's inverse-square law in the Greenland Ice Cap, with M.E. Ander, G. A. Zumberge, T. Lautzenhizer, R. Parker, G. Backus, A. Cooper, M. Gorman, E. Fisher, L. Hanson, G. A. McMechan, R. Parker, G. Stevenson, A. D. Chave, P. Hammer, J. Hildebrand, R. Kelty, M. Nieto, G. Sasagawa, C. Sidles, R. Spiess, J. Wirtz, *Physical Review Letters*, v. 62, p. 985-988, 1989.
- Determination of Bedrock Topography beneath the Greenland Ice Sheet by three dimensional imaging of radar sounding data, with E. Fisher, G. McMechan, M. Gorman, A. P. R. Cooper, M. E. Ander, M. A. Zumberge, *Jour. of Geophys. Research*, v. 94, p. 2874-2882, 1989.
- A new field experiment of Newton's Inverse Law in the Greenland Icecap, with M. Ander, M. Zumberge, T. Lautzenhizer, R. Parker, M. Nieto, M. Gorman, G. McMechan and J. Ferguson, *in* Proceedings of 14th Texas Symposium on Relativistic Astrophysics (E. J. Feuyues, ed.), *Annals of New York Academy of Sciences*, v. 571, p. 672-681, 1989.
- An absolute wireline calibration to support a test of Newton's inverse square law, with M. E. Ander, W. Kerr, C. C. Glover, and M. A. Zumberge, *Geophysics*, v. 55, no 7, p. 920-923, 1990.
- Gravity field of Colombia, eastern Panama, and adjacent marine areas, with J. N. Kellogg, V. M. Godley, C Ropain and A. Bermudez, *Geol. Soc. America Map and Chart Series MCH070*, 1990.
- Analysis of the Greenland ice sheet experiment in terms of new gravitational forces, with M. N. Nieto, R. Hughes, T. Goldman, M. Ander, G. McMechan and J. Ferguson, *Physics Letters B*, v. 288, p. 448-452, 1990.
- The Greenland Gravitational constant experiment, with M. Zumberge and others, *Jour. of Geophys. Research*, v. 95, no. B10, p. 5483-15501, 1990.
- Bouguer gravity anomalies and crustal structures of northwestern Mexico, with R. Schellhorn and M. F. de la Fuente, *in* Gulf and Peninsular Province of the Californias, *Amer. Assoc. Pet. Geol. Memoir 46*, chapter 11, p. 197-215 1991.
- Regional gravity investigation of Honduras, Central America, with M. E. Ander, M. de la Fuente and E. Fisher, *Jour. of Volcanology and Geothermal Resources*, v. 45, p. 62-70, 1991.
- Regional-residual gravity anomaly separation using minimum-curvature technique, with K. Mickus and W. D. Kennedy, *Geophysics*, v. 56, p. 279-284, 1991.
- A geophysical model of the Espanola basin, Rio Grande Rift, New Mexico, with S. Baldrige and others, *Geophysics*, v. 56, p. 340-353, 1991.
- Geophysical investigations of the Platanares geothermal site, Honduras, Central America, with M. E. Ander and M. F. de la Fuente, *Jour. Volcanology and Geothermal Res.*, v. 45, p. 11-27, 1991.
- Definition of the Vertical for the SSC using GPS, leveling and gravity, with A. Leick, C. Aiken and J. Kor, *Surveying and Land Information Systems*, v. 52, p. 69-74, 1992.

- Gravity and GPS methods: Useful techniques for reservoir surveillance, J. Brady, D. Wolcott, and C. Aiken, *Log Analyst*, p. 32-44, 1994.
- Tectonic development of Panama, Costa Rica and the Colombian Andes: Constraints from gravity and Global Positioning System geodetic studies, with J. Kellogg, V. Vega, *in* Geodetic and Tectonic Development of the Caribbean Plate Boundary in Southern Central America (P. Mann, ed.), *Geol. Soc. Amer. Special Bulletin* 295, p. 75-95, 1995.
- An integrated 3-D gravity and seismic study of the Ouachita Frontal Thrust Belt, Pittsburg and Latimer Counties, Oklahoma, with H. Hunter-Huston, G. Green and C.L. V. Aiken, *in* Gravity and Magnetic Exploration Case Histories, *Amer. Assoc. Pet. Geologists/Soc. Explor. Geophysicists, Special Publication*, *in* Geologic Applications of Gravity and Magnetism: Case Histories, R.I. Gibson, and P.S. Millegan, eds., SEG Geophysical Lecture Series Nol. 8, AAPG Studies in Geology, No. 43, p. 75-79, 1998.
- Integrated studies of Mexico with gravity, magnetic and GIS database, CLV Aiken, M. Balde, X. Xu, MG Abdelsalam, MF de la Fuente and M. Mena, *Leading Edge*, Society of Exploration Geophysicists, p. 1779-1785, Dec. 1997
- Recent developments in digital gravity data acquisition on land, CLV Aiken, M. Balde, JF Ferguson, GD Lyman, X. Xu and AH Cogbill, *Leading Edge*, Society of Exploration Geophysicists p. 93-97, Jan. 1998
- An Integrated Digital Gravity/GPS/GIS/Reflectorless Laser System for High Resolution Gravity Surveys, CLV Aiken, GD Lyman, M. Balde, and X. Xu., *Proceedings from the High Resolution Geophysics Workshop, University of Arizona, Tucson, Az*, CD-ROM, 1997.
- Hare, J., Ferguson, J. F., Aiken, C. L. V. and Brady, J. L., 1999, "A 4-D microgravity Method for Waterflood Surveillance: A model study of the Prudhoe Bay Reservoir, Alaska," *Geophys. Res.*, p. 78-88.
- Balde, M., Fishman, J., Aiken, C. L. V., Abdelsalam, M. G. and de la Fuente, M. F., 1999, "A GPS Supported Gravity Survey in the Amazon of Ecuador," *GPS Solutions*, v. 3, p. 3-18.
- Xu, X., Aiken, C., Neilsen, K. S., 1999, "Real Time and the Virtual Outcrop Improve Geological Field Mapping", *Transactions of The American Geophysical Union, EOS*, v. 80, p. 322-324.
- Hare, J., Ferguson, J., Aiken, C. L. V. and Oldow, J 2001, *Journal of Geophysical Research*, "Quantitative Characterization and Elevation Estimation of Lake Lahonton Shoreline Terraces from High Resolution Digital Elevation Models", v.106, p.26761-26774.
- Xu, X., Aiken, C., Bhattacharya, J. P., Corbeanu, R. M., Nielsen, K. C., McMechan, G. A. and Abdelsalam, M. G. 2000, "Creating Virtual 3D Outcrop," *Leading Edge*, Soc. of Exploration Geophysicists, February, p.197-202.
- Oldow, J., Aiken, C., Ferguson, Hare, J. and Hardyman, R., 2001, Active displacement transfer and differential motion between tectonic blocks within the central Walker Lane, western Nevada, *Geology*, v.29, p.19-22.
- Xu, X., Bhattacharya, J., Davies, R. K., and Aiken, C. L. V., 2001, "Digital Geologic Mapping of the Ferron Sandstone, Muddy Creek, Utah with GPS and lasers" *GPS Solutions*, V.5, No.1, John Wiley, p. 23-32.
- Oldow, J.S., Ferranti, L., Lewis, D.S., Campbell, J.K., D'Argenio, B.D., Catalano, R., Pappone, G., Camignani, P., Conti, P., and Aiken, C.L.V., 2002, Active fragmentation of Adria, the northern African promontory, central Mediterranean orogen, v.30, p.779-782.
- Zeng, X., McMechan, G.A., Bhattacharya, J.P., Aiken, C.L.V., Xu, X., Hammon III, W.S., and Corbeanu, R.M, 2005, *Geophysical Prospecting*, 3-D imaging of a reservoir analog in point bar deposits in the Ferron sandstone, Utah using ground-penetrating radar, *Geophysical Prospecting* 52 (3), 151–163...
- Olariu, C., Bhattacharya, J. P., Xu, X., Aiken, C.L.V., Zeng, X., and McMechan, G. A., 2005, Integrated study of ancient delta front deposits, using outcrop, ground penetrating radar and three dimension photorealistic data: Cretaceous Panther Tongue sandstone, Utah. in: J.P.Bhattacharya and L. Giosan (eds.) *River Deltas: Concepts, Models and Examples*. SEPM Special Publication 83.
- Chen, Tianyou, Ferguson, John, Aiken, Carlos, and Brady, Jerry, 2005, Real-time data acquisition and quality control for gravity surveys, *The Leading Edge*; Society of Exploration Geophysicists, July 2005; v. 24; no. 7; p. 702-704, 99
- Hinze, William J., Aiken, Carlos, Brozena, John, Coakley, Bernard, Dater, David, Flanagan, Guy, Forsberg, Rene, Hildenbrand, Thomas, Keller, G. Randy, Kellogg, James, Kucks, Robert, Li, Xiong, Mainville, Andre, Morin, Robert, Pilkington, Mark Plouff, Donald, Ravat, Dhananjay, Roman, Daniel, Urrutia-Fucugauchi, Jaime, Veronneau, Marc, Webring, Michael and Winester, Daniel, 2005, New standards for reducing gravity data: The North American gravity database, *Geophysics*, Society of Exploration Geophysicists Vol. 70, No. 4, pp. J25–J32,
- Thurmond, J., Loseth, T., Rivenaes, R., Martinsen, O., Xu, X. and Aiken, C., 2005, Deep-Water Outcrops of the World Atlas: ed. By T. Nilsen., R. Shew, G. Steffens, and J. Studlick, Tulsa, OK: American Association of Petroleum Geologists Special Publication. CD-ROM
- Olariu, J., Bhattacharya, X., Xu, C, Aiken, X. Zeng., and G. McMechan, 2005, Using Outcrop Data in the 21st Century – New methods and applications, with example from the Ainsa Turbidite System, Ainsa, Spain, Integrated study of ancient delta front deposits, using outcrop, ground penetrating radar and three dimension photorealistic data: Cretaceous Panther Tongue sandstone, Utah, *River Deltas: Concepts, Models and Examples* J.P.Bhattacharya and L. Giosan (eds.). Tulsa, SEPM Special Publication 83.

- Chen, Tianyou , Aiken, Carlos L.V. Ferguson, , John , Gutierrez, Roberto G. and Jeffress, Gary A, 2005, Geoid estimation in a coastal region: Corpus Christi, Texas, USA, Proceedings: Dynamic Planet 2005 Monitoring and Understanding a Dynamic Planet with Geodetic and Oceanographic Tools. Cairns, Australia , Joint Assembly of International Associations: IAG, IAPSO and IABO
- Oldow, John S.; Walker, J. Douglas; Aiken, Carlos L. V.; Xu, Xueming, 2006, Digital Acquisition, Analysis, and Visualization in the Earth Sciences Eos, Transactions American Geophysical Union, Volume 87, Issue 35, p. 351-351
- Olariu, Mariana I. , Ferguson , John F. , Aiken, Carlos L.V. and Xu, Xueming, 2008, Outcrop fracture characterization using terrestrial laser scanners: Deep-water Jackfork sandstone at Big Rock Quarry, Arkansas Geosphere ; February; v. 4; no. 1; p. 247-259
- Alfarhan, Mohammed, Tuck, Dean, White, Lionel, Aiken, Carlos, , 2008, LaserRangefinders and ArcGIS Combined With 3d Photorealistic Modeling For Mapping Outcrops In The Slick Hills, Oklahoma, Geosphere e- v. 4; no. 3; p. 576-587
- Chen, T. Aiken, CIV, J Ferguson, J., Gutierrez, R., And Jeffres, G., 2009, High-Resolution Local Geoid Computation At Corpus Christi Bay, Texas, GPS Solutions.
- Aiken, C., Alfarhan, M., White, L., and Abdelsalam, M, 2009, Three-Dimensional Globally-Accessed Monuments Experiment (3D-GAME): The UT Dallas – Missouri S&T Effort, Joint Virtual Systems and Multi Media 2008 Conference Workshop Volume "Heritage in the Digital Era", Multi-Science Publishers, London. P 119-129
- Aiken, C. and others, , VLBI-GPS Geospatial Registration, in press, TLS Workshop 8-10 September, 2008, NASA Goddard Space Flight Center, NASA, Eos
- Valcik, N., Aiken C.L.V., Xu, X., Alfarhan, Mohammed S., 2009, Cutting Edge Information and Virtual Technologies for Homeland Security in the 21st Century, to International Perspectives On Crime And Justice, Chapter Twenty One, Edited by K. Jaishankar Ph.D. Published by Serials Publications, New Delhi, p. 476-509

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- White, Lionel, Alfarhan, Mohammed, Cline, Jarvis, Abdelsalam, Mohamed, and Aiken, Carlos, "Analysis Of Geological Outcrop Virtual Models Using The Arcgis Platform", 2009 GSA, South-Central Section - 43rd Annual Meeting, 16-17 March 2009, Dallas, Texas
- Aiken, Carlos L.V., Oldow, John S., Alfarhan, Mohammed, White, Lionel S. Jr, and Ahmed, Tarig, "Monitoring Growth Of The Daisetta, Texas Sinkhole With Terrestrial Laser Scanning, Close Range Digital Photography, And GPS", 2009 GSA, South-Central Section - 43rd Annual Meeting, 16-17 March 2009, Dallas, Texas
- Alvarado, Iris, Wurtz, Michelle, White, Lionel S. Jr, Alfarhan, Mohammed, and Aiken, Carlos L.V., "virtual Model It And They Will Learn", 2009 GSA, South-Central Section - 43rd Annual Meeting, 16-17 March 2009, Dallas, Texas
- Kashouh, Michele, Burnham, Brian, Alfarhan, Mohammed, White, Lionel, Pujana, Ignacio, and Aiken, Carlos, "Site Documentation of Global Stratigraphic Sections And Points (Gssp) Through Methods Of Three Dimensional Geologic Modeling. Case Study: The Wal-Mart Section Of Ten Mile Creek, Dallas Texas", 2009 GSA, South-Central Section - 43rd Annual Meeting, 16-17 March 2009, Dallas, Texas
- White, Lionel; Alfarhan, Mohammed; Aiken, Carlos, "The Construction and Analysis of 3D Photorealistic Models of Geological Outcrops", SPAR Point Research, 2009, "3D Imaging and Positioning for Engineering / Construction / Manufacturing", 6th Annual Conference on 3D Laser Scanning, Dynamic Survey, Lidar and Dimensional Control, March 30 – April 1, 2009, Denver, Colorado
- Lionel White, Sumanta Chatterjee, Miao Wang, Mohammed Alfarhan, Carlos Aiken, Christopher Kendall, "Cyber Mapping of sequence stratigraphic surfaces in outcrops: LIDAR provides a cutting edge to sedimentary modeling", AAPG 2009 Annual Convention & Exhibition, 2009, SEPM Research Group for Sequence Stratigraphy, June 7-10, 2009, Denver, Colorado.
- White, Lionel; Alfarhan, Mohammed; Cline, Jarvis; Aiken, Carlos, "Real-time Mapping of Laser Rangefinder to Photograph in ArcMap", ESRI International User Conference (ESRI UC), 2009, July 13–17, 2009, San Diego Convention Center, San Diego, California, Proceeding paper, http://proceedings.esri.com/library/userconf/proc09/uc/papers/pap_1283.pdf.
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INVITED PRESENTATIONS

- Gravity studies of western U.S. and Mexico. Presented at the El Paso Geological Society meeting, El Paso, TX, Sept., 1979.
- Rio Grande Rift geophysical studies. Presented to the Texas A & M Univ. Oceanography and Geodynamic Research Program, College Station, TX, Jan, 1980.
- Residual gravity studies in northern Mexico using a variable topographic datum. Invited speaker at the Seminar of Petroleos Mexicano (PEMEX), Mexico City, Mexico, July, 1979.
- Gravity studies in the United States. Invited speaker at the meeting of Potential Field Geophysicists, Houston, TX, March, 1979.
- Gravity and MT applied in geothermal exploration and resource evaluation in southwestern United States. Invited speaker at the Texas section, Geothermal Resource Council, Dallas, TX, March, 1980.
- Geophysical studies in Chihuahua, Mexico. Invited speaker at Earth Sciences Colloquium, Southern Methodist University, Dallas, TX, March, 1980.
- Geophysical studies of the Chihuahua City region, with G. R. Keller, D. Garvey, P. Goodell and M. de la Fuente. Symposium on Uranium in Volcanic and Volcanoclastic Rocks, 1980 Annual meeting of the Southwest Section of the AAPG, El Paso, TX, Feb., 1980 (abs., Transactions, p.46).
- Gravity and magnetotellurics in exploration for hot dry rock geothermal resources, presented at Workshop on Hot Dry Rock Geothermal Resource Exploration, Los Alamos National Laboratories, June, 1982.
- Geophysical studies of Chihuahua, Mexico. Presented at the University of Texas at Arlington, Feb., 1985.
- Geophysical exploration of Triassic Basins in eastern United States. Presented at the San Antonio Geophysical Society, Feb., 1985.
- Gravity and magnetic studies of Baja California and Sonora Mexico. Presented at Workshop on AAPG Memoir on West Coast of Mexico, at Oregon State University, Corvallis, Oregon, Feb., 1986.
- Detail and regional gravity studies of the Arkoma Basin and Ouachita Overthrust, Oklahoma. Presented at Potential Field Geophysicists Meeting, Dallas, TX, Nov., 1986.
- A experiment to investigate non-Newtonian Gravity on the Greenland Ice Cap. Geophysics Seminar, Southern Methodist University, October, 1988.
- The Big G Experiment in Greenland: The Search for a Fifth Force of Nature. *C.O.G.S.*, October, 1988.
- Defining the Universal Gravitational Constant on the Greenland Ice Cap and its implications. Potential Field Geophysics, 1988.
- Results from the 1987 Greenland Big G Experiment. Argonne National Laboratory, Chicago, Illinois, November, 1988.
- Gravity and tectonics of Mexico. University of New Orleans, New Orleans, Louisiana, September, 1989.
- Gravity studies of Mexico. Institute of Geophysics, University of Texas at Austin, Austin, TX, 1990.
- Gravity studies of Mexico (with M. F. de La Fuente), The tectonics and geophysics of Mexico. University of New Orleans and Tulane University, New Orleans, LA, 1990.
- GPS applications to geophysical surveys and deformation studies, University of North Dakota, Grand Forks, ND, September 30, 1990.
- GPS High Accuracy Applications to Land, Marine and Airborne Surveys, Hydrographic Society of Houston, October, 1992.
- Houston Society of Potential Field Geophysicists, Houston, TX, “Reflectorless laser rangefinding systems for gravity terrain corrections”, 1997.
- Schlumberger Laboratory, Ridgfield, Conn., “Digital gravity and geologic mapping”, 1997
- Louisiana Society of Professional Surveyors., LSPS Annual Covention, Lafayette, La., Short Course on “Geoidal Corrections in Surveying”, 1997
- Region 10 Dallas Independent School District, Ins and Outs of GIS, January, 2000
- UNAM, Instituto de Geofisica y Geologia, Mexico City, Mexico, Digital methods of geologic mapping, April, 2000
- ExxonMobil Corp., Houston, TX, one-day seminar/training course, 3D Virtual geology acquisition and analysis, March, 2000
- Norsk Hydro Oil, Bergen, Norway, 5 day training course, Digital geologic data acquisition and analysis, 2000,
- American Association of Petroleum Geologists Annual Meeting, New Orleans, LA, Exhibition on 3D virtual geology, Center for Lithospheric Studies, April, 2000.
- Geospatial Information and Technology Association, Houston, TX, Digital Data Acquisition using lasers and GPS, March 2000
- 3D Virtual Earth Models by GPS integrated with laser rangefinders and close-in oblique digital photography, Dept. of Geosciences, San Diego State University, Oct., 2001
- Scientists Helping America Conference, Dept. of Defense, Special Operations Command, Arlington, Va, March 11-13, 2002.
- Virtual Geology:Acquisition and Analysis, Univ. of Idaho, Demonstration and Seminar, Moscow, Idaho, Oct. 9-12, 2002.

- 3D Photorealistic Models of Geology: Examples in the US, Spain and Mexico of Virtual Geology for Analysis, Interpretation and Virtual Field Trips, ChevronTexaco Geology Forum, Galveston, TX, Oct. 15, 2002. (with X. Xu)
- Scientists Helping America Conference, Dept. of Defense, Special Operations Command, Arlington, VA, March 11-13, 2002.
- Virtual Geology: Acquisition and Analysis, Univ. of Idaho, Demonstration and Seminar, Moscow, Idaho, Oct. 9-12, 2002.
- 3D Photorealistic Models of Geology: Examples in the US, Spain and Mexico of Virtual Geology for Analysis, 2002.
- Interpretation and Virtual Field Trips, ChevronTexaco Geology Forum, Galveston, TX, Oct. 15, 2002.
- 3D Virtual Geology, NSF EarthScope Complementary Geophysics Workshop, Carlos Aiken, Denver, Colorado March, 2003.
- 3D photorealistic Geology, Carlos Aiken and Xueming Xu, Denver, CO, NSF Workshop on Cyberinfrastructure (CI) for the Integrated Solid Earth Sciences (ISES), March, 2003. 2003 DLESE Annual Meeting, Boulder, CO 2003
- 3D Virtual Geology by integrated lasers, cameras and GPS, Carlos Aiken, Boise, Idaho, NSF Workshop on Development of a Cyberinfrastructure for Research and Education in Structural Geology, October, 2003.
- Use of fast laser scanners, gps and digital photography to create a virtual world, Carlos Aiken and Xueming Xu, Rowlett, TX, City of Rowlett. GPS Training and Product Demonstration, May, 2003.
- Mobile utility gps mapping of the city of Rowlett infrastructure utilizing laser offsets, Cody Cantrell and Carlos Aiken, City of Rowlett GPS Training and Product Demonstration, May, 2003.
- The Use of Ground-Based Laser Scanners, GPS and Digital Cameras to Rapidly Create 3D Virtual Models, Carlos Aiken, Houston, TX, ExxonMobil Upstream Co., September, 2003.
- Laser/photo realistic scanning and modeling along two railroad cuts along the Brazos integrated with conventional geological interpretation of Karen Steele, Carlos Aiken, Mineral Wells, TX, AEG-Texas Summer Field Trip, July, 2003.
- 3D digital mapping and visualization, Carlos Aiken Xueming Xu, Moscow, Idaho, Geology Seminar Series, Univ. of Idaho, March, 2003.
- 3D Virtual Geology, Carlos Aiken and Xueming Xu, Lawrence, Kansas, NSF Workshop on Cyberinfrastructure (CI) for the Integrated Solid Earth Sciences, March, 2003, Univ. of Kansas.
- Virtual 3D Geology: The Virtual Field Trip Is Here, Carlos Aiken and Xueming Xu, Austin, TX, Annual Association of Engineering Geologists/American Institute of Professional Geologists (AEG/AIPG) Spring Symposium Engineering, Environmental, Hydrologic, Resource and Research Geology, April, 2003.
- Mobile utility GPS mapping of the City of Rowlett infrastructure utilizing laser offsets: Final Report, City of Rowlett, May 2003
- 2003 DLESE (Digital Library of Earth Science Education) Annual Meeting, Carlos Aiken, Boulder, CO. July, 2003
- Acquisition and Use of Virtual Geologic Models, 2004, Northfield, MN, NSF National Association of Geology Teachers, Cutting Edge Visualization Workshop.
- The Use of Ground-Based Laser Scanners, GPS and Digital Cameras to Rapidly Create 3D Virtual Models, Houston, TX, ExxonMobil Upstream Corp.
- Photorealistic Capture and 3D Modeling : The Virtual World, Carlos, 2005, Houston, TX, Shell Oil USA Corp., Geowall demo and seminar
- Rapid Site Capture In 3d At High Accuracy With Fast Laser Scanners, 2005, Carrollton, TX, Conestoga Engineers, Geowall demo and seminar
- Virtual Fieldtrips in Geology, 2005, Plano, Tx, Plano Campus, Collin County Community College, Geowall demo and lectures to Earth Sciences Course
- Virtual Fieldtrips in Geology, 2005, McKinney, TX, McKinney Campus, Collin County Community College, Geowall demo and lectures to Earth Sciences Course
- Photorealistic Capture and 3D Modeling, 2005, Irving, TX, Pioneer Resources, Geowall demo and seminar
- Close Range Laser Scanning and Photography, 2005, Baltimore, MD, Geospatial Applications to Antarctic Research Workshop Seminar and workshop
- Photorealistic Capture and 3D Modeling : The Virtual World 3D Scanning, 2005, Houston TX, SPAR 2005 Conference and Exhibi
- Color from Real Photos Applied to Laser Scanning, 2005, Dallas TX, Dallas Rapid Transit, DART Seminar Series
- UTD Virtual Mapping Program: Photorealistic Capture and 3D Modeling, 2006, ExxonMobil Research Lab, Houston, TX,
- Aiken, Carlos, 2006, 3D Virtual Models of Geology by Accurate Mapping of Photography onto Surfaces, invited, University of Missouri-Rolla, Rolla, Missouri
- Photorealistic Capture and 3D Modeling : The Virtual World, 2006, Pioneer Resources, Dallas, TX
- Laser Scanning with Color: the Creation and Use of 3D, 2006, Carlos Aiken, Xueming Xu, Bobbie Neubert,
- Photo real virtual models with presentations in 3D stereo, 2006, Texas Society of Professional Surveyors, Dallas Training on digital geologic mapping, Univ. of Idaho, Moscow, Idaho.

- Carlos Aiken, Xueming Xu, Mohammed Alfarhan, 2006, Virtual Mapping: Photo Real Capture and 3D Modeling, 2006 GEON April 6-8 [GEON Workshop to Identify Ground-Based Digital Acquisition, Analysis, and Visualization Needs of the Geological Science Community](#), Univ. of California at San Diego, San Diego, CA
- UTD Virtual Mapping Program: Photorealistic Capture and 3D Modeling, 2006, ExxonMobil Research Lab, Houston, TX
- 3D Virtual Models of Geology by Accurate Mapping of Photography onto Surfaces, University of Missouri-Rolla, Rolla, 2007, Missouri
- Photorealistic Capture and 3D Modeling The Virtual World, 2007, Pioneer Resources, Dallas, TX
- Laser Scanning with Color: the Creation and Use of 3D Photo real virtual models with presentations in 3D stereo, 2007, Texas Society of Professional Surveyors, Dallas, TX
- Aiken, C., Alfarhan, M., White, L., and Abdelsalam, M, Three-Dimensional Globally-Accessed Monuments Experiment (3D-GAME): The UT Dallas – Missouri S&T Effort Joint Effort, Virtual Systems and Multi Media Conference, Lemasol, Cyprus
- Aiken, C., VLBI-GPS Geospatial Registration, TLS Workshop 8-10 September, 2008, NASA Goddard Space Flight Center, NASA
- Oldow, J S, Alfarhan, M, White, L S, Ahmed, T, Alvarado, M I, Cline, J, Shilpakar, P, Aiken, C L, “Monitoring Growth of the Daisetta, Texas Sinkhole With Terrestrial Laser Scanning, Close Range Digital Photography, and GPS”, 2008 AGU Fall Meeting 15-19 December 2008, San Francisco, California.
- Monitoring Growth of the Daisetta, Texas Sinkhole With Terrestrial Laser Scanning, Close Range Digital Photography, and GPS, Houston Geological Society and Association of Engineering and Environmental Geologists, Daisetta Sinkhole Fieldtrip, Daisetta, Houston.
- Four Lectures on 3D Photorealistic geologic modeling, Saudi ARAMCO, Dhahran, Saudi Arabia, 2009.

GRANTS AND CONTRACTS

- National Science Foundation. Seismic data processing and computational system. January 1, 1979 - December 31, 1979. \$30,000.
- Los Alamos Scientific Laboratory. Analysis of available geophysical data along proposed LASL magnetotelluric profiles. October 1, 1978 - October 1, 1980. \$44,366.
- Defense Mapping Agency. Gravity surveying in Mexico 2006, . July 12, 1979 - September 31, 1981. \$61,000.
- University of Texas at El Paso. Evaluation and combined geophysical interpretations of N.U.R.E. and related geoscience data in the Van Horn and Pecos quadrangles, Texas: Modification to include the Marfa, Fort Stockton, Presidio, and Emory Peak Quadrangles. October 1, 1979 - August 31, 1980. \$25,296.
- Purdue University. An integrated geophysical-geological study of potential dry hot rock sites in the mid-continent. March 1, 1980 - October 1, 1980. \$20,000.
- National Science Foundation. Reconnaissance of the tectonophysics of Chihuahua, Mexico, and west Texas. October 15, 1978 - October 15, 1981. \$55,000.
- Atlantic Richfield Co. Study of depth-to-Curie isotherm methods. 1980. \$3,000.
- University of Nebraska. Gravity analysis of Nebraska. April 1, 1981 - September 30, 1981. 11,017.
- Defense Mapping Agency. Gravity surveying in Mexico. January 1, 1982 - September 30, 1984. \$875,000.
- Various petroleum industry support. Compilation and analysis of gravity data in South and Central America. June 1, 1982 - open. To date: \$90,000.
- Various petroleum industry support. Geophysical studies of Ouachita trend from Mississippi to Mexico. June 1, 1982 - open. To date: \$67,000.
- Defense Mapping Agency. Densification of gravity stations in Mexico. December 20, 1984 - December 20, 1985. \$365,000.
- Southeastern Exploration and Production Company. Geophysical study of Sanford Basin, North Carolina. March 1983 - July 1983. \$7,000.
- Earth Science Resources Institute (Co-PI). Geophysical studies of Triassic Basins. October 1, 1984. \$25,000.
- Sun Exploration and Production Company. Gravity analysis of Honduras March 1984 - December 31, 1984. \$10,000.
- Air Force Office of Scientific Research (Co-PI). Geophysical investigations at Pahute Mesa, Nevada. January 1984 - January 1986. \$173,000.
- Exxon. Gravity Studies in Latin America. January 1986 - January 1987. \$10,000.
- AMOCO and Shell Oil (Co-PI). Phase Imaging of EM Data. January 1986 - January 1987. \$20,000
- Los Alamos National Laboratory (Co-PI). 3 D Migration of ice sounding radar. 1988. \$15,000.
- Texas State Highway and Public Transportation Dept. A detailed geoid of Texas. November, 1988 - November, 1989. \$49,400.

Total Compagnie Francaise de Petroles, royalties for copyrighted report. Gravity Studies of Latin America. 1988. \$10,000.

Societe National ELF Aquitaine, for copyrighted report. Gravity Studies of Latin America. 1988. \$10,000.

Permanent University Funds, University of Texas System. Acquisition of 2 dual frequency GPS satellite receivers. 1989. \$79,815.

Texas Advanced Technology Program. A Search for a violation of Newton's Law of Gravity using thermal probes in Antarctica. 1989-1992. \$150,000.

Enserch Exploration Co. Gravity and Magnetic Studies of the Ouachita overthrust. 1990. \$15,000.

North Dakota, University of North Dakota and U. S. Geological Survey. A GPS controlled gravity study of gravel aquifers in the Ft. Berthold Indian Reservation. September 1990 - March 1991. \$12,000.

National Science Foundation. Geodynamics of Central Walker Lane, Western Great Basin. 1994-1997. \$81,000

ARCO. GPS Studies. 1994. \$13,000.

ARCO Alaska, Inc. GPS Studies for Reservoir Management in Prudhoe Bay, Alaska. 1994. \$15,000.

ARCO. Gravity Studies. 1994. \$250,000.

Conoco, Amoco and Unocal. Mexican GIS Consortium. 1993-1994. \$150,000

Mobil Oil, CONOCO, Mexican GIS Consortium, 1994-1995, \$130,000

EXXON. GIS Thesis Data Base of Mexico, 1996, \$14,500

Texas Coastal Ocean Observation Network, GAPS Gravity Tycoon Pilot Project, August 17, 1996 to June 17, 1997. \$13,640.

Expansion of Remote Sensing Facilities in the Geosciences Department at the University of Texas at Dallas, Co-Principal Investigator with R. J. Stern, NASA 1/98-12/31/98 (\$128,308)

ATP. GPS and Texas High Resolution Geoid for Coastal Environmental Management Engineering, and Hazard Assessment. January 1, 1998 – December 31, 1999, \$92,510.

ARCO Alaska, Water flood management by surface gravity, 2000, \$100,000 (co-PI with J. Ferguson)

ARCO Alaska, Water flood management by surface gravity, 2001, \$34,000 (co-PI with J. Ferguson)

Various companies, Virtual Geology, 2000, \$12,000.

Norsk Hydro ASA, Consortium on Digital Geology, 2001-2002, \$30,000

Norsk Hydro ASA, Digital Geologic Mapping of the Ainsa Basin, Spain, 2001-2002, \$70,000

BP Alaska, Surface Gravity Monitoring of Water Injection, Prudhoe Bay, Alaska, 2002, \$100,000

Norsk Hydro ASA, 2002, Digital Geology Consortium, \$30,000

Norsk Hydro ASA, 2002, Support for Digital Geologic Mapping at San Clemente Beach, \$3000

Norsk Hydro ASA, 2003, Digital Geology Consortium, Jan 2003-Dec 2003, \$30,000

Norsk Hydro ASA, 2003, Preparation for Digital Geologic Mapping of Europe, (Spain), November 2003-June 2004, \$37,500

City of Rowlett, 2003, Utility Mapping of the City of Rowlett, \$18,000.

Norsk Hydro ASA, 2003, Preparation for Digital Geologic Mapping of Europe: Ireland, \$48,000

Norsk Hydro ASA, 2004, Preparation for Digital Geologic Mapping of Europe: United Kingdom, \$70,000.

Norsk Hydro ASA, 2004, Preparation for Digital Geologic Mapping of Europe: Guadelupes, New Mexico, \$78,000.

Norsk Hydro ASA, 2004, Preparation for Digital Geologic Mapping of Europe: with AGIP in Spain, \$28,000.

Norsk Hydro ASA, 2005, Preparation for Digital Geologic Mapping of Europe, Jan 2005-March 2006, \$76,000

NSF, Cyber-Mapping for Teaching Undergraduate Geoscience Courses, November 2006-November 2008, \$149,000

NSF, Cyber-Mapping for Teaching Undergraduate Geoscience Courses, NSF, 12/06 to 12/08 \$149,000. submitted in 2006 but changed to subcontract with PI moving to Missouri Univ. of Science and Technology, in 2007. \$49,000.

NSF, Collaborative Research: Facility Support: Building the INTERFACE facility for cm-scale, 3D digital field geology, NSF, 9/2007-3/2010 \$183,000

University of Calgary, Milk River, Alberta, Canada, Virtual Mapping, 5/3/2008-9/31/2008, \$25,000

Saudi Aramco Co., Daharan, Saudi Arabia, Three dimensional photorealistic capture and modeling of geologic outcrops in Saudi Arabia, 03/01/2010-03/01/2011, \$587,000