

## VITA

**Dr. ROGER N. ANDERSON**

**SUMMARY (If any of the links below do not open with a click, cut and paste into your browser):**



Roger is President and CEO of the Big Data Analytics company AKW Analytics Inc. (<http://AKWanalytics.com>). As CEO of AKW, Roger leads a team of 10+ data scientists and software engineers selling AKW's patented Petroleum Analytics Learning Machine™ (PALM) as Software as a Service (SaaS) in the Exploration and Production business, both conventional, and especially unconventional Shale Oil & Gas plays. Roger is AKW's resident Hydraulic Fracturing expert, having led fracs in more than 100 onshore and offshore conventional wells and analyzed thousands of frac stages in hundreds of horizontal shale wells.

Roger has technical, business, computational, and working collaborations in residence at Baker Hughes,

Boeing, BBN, Booz and Co, BP, Brookhaven National Labs, Chevron, Con Edison, the Earthquake Research Institute of the University of Tokyo, ExxonMobil, Fedex, Finmeccanica, GE, IBM Research, Kansas Geological Survey, KBR, Lockheed Martin, Pennzoil, Rudin Management, Schlumberger, Royal Dutch Shell, Sinclair, the Texas Energy Center, the Urban Utility Center of NYC, Woods Hole Oceanographic Institution, United States Geological Survey, the University of California at Berkeley and the University of Hawaii. Roger is co-founder of start-up energy companies 4-D Technology (sold to Western Geophysical, later acquired by Baker Hughes International), Bell Geospace (in collaboration with Lockheed Martin) CALM Energy Inc., and CALM Water Inc.

Roger is the inventor of 17 Patents granted and 13 pending, so far, and has written 5 books, edited 4 others, published 270+ peer-reviewed scientific and engineering papers, and produced 15 technical videos. Roger retired after 42 years at Columbia University as a Senior Research Scientist at the Center for Computational Learning Systems (CCLS) in the Fu School of Engineering and Applied Science (SEAS) and the Lamont Doherty Earth Observatory (Earth Institute). He is an Adjunct Professor at the Department of Earth and Environmental Sciences at Columbia University, and for 32 years, Roger taught "Planet Earth" a part of the famous Columbia College core curriculum. The highly rated course was a last resort science-requirement for graduation, and as such, it was one of the most popular courses at Columbia for more than 20 years. Roger has graduated 9 Ph.D. students, many of whom are now leaders in national scientific and engineering communities (Columbia, National Environmental Research Laboratory, University of Illinois, Chicago and US Geological Survey) and international business communities (Head of IBM Research Brazil, Citibank, Pemco).

Roger has led teams that have developed the next generation of machine learning control systems for unconventional horizontal shale oil and gas wells (including smart hydraulic fracturing, and smart city infrastructure (electricity, water, steam, electric delivery vehicle fleets, skyscrapers). Roger's team was recently chosen as the winning University Program in General Electric's Ecomagination Innovation Challenge, winning a \$1.2 million prize. While at the Lamont-Doherty Earth Observatory of Columbia, he founded the Borehole Research, Global Basins, 4-D Seismic, Seismic Reservoir Simulation, Portfolio Management and Energy Research Groups. Roger has been Chief Scientist of more than 20 oceanographic cruises, including in 1979, the first U.S. research ship ever to visit the Peoples Republic of China. The Wall Street Journal recently characterized him as "a computer-imaging pioneer". However, his most difficult assignment ever was as Head of Umpires for many years at the West Side Little League in Manhattan, NY.

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Homepages:

<http://akwanalytics.com>

<http://bellgeo.com/>  
<http://www.calmenergyinc.com/>  
<http://leanenergy.ldeo.columbia.edu>  
<http://www.ldeo.columbia.edu/~aboulang/4d4/>  
<http://idse.columbia.edu/roger-n-anderson>  
<http://blogs.ei.columbia.edu/?s=Roger+Anderson>  
<http://ccls.columbia.edu>  
<http://www.pennwellblogs.com/calm/>

### **FIELDS OF INTEREST:**

Research, Development & Deployment of Smart Infrastructure, Smart Electric Grid, Smart Building and Smart Cities Control Systems, Total Property Optimization, Smart Electric Vehicle Fleet Charging, Forecasting Package and Manufacturing Loads, Lean Energy Management, Real Options, Portfolio Management, Petroleum Reservoir Management, Alternative Energy Research, 4D Earth Imaging using Seismic & Gravity Gradiometry, Logging, Earthquake Stress Measurements, and Hydraulic Fracturing.

### **EXPERTISE:**

Unconventional oil and gas, <http://akwanalytics.com>  
 E-mail me for login/password for demo of our patented Petroleum Analytics Learning Machine™ .  
 Smart Urban Commercial Office Buildings,  
[http://129.236.31.229/download/EnergyBiz\\_Smart\\_Building\\_Op\\_Ed\\_Final\\_v2.doc](http://129.236.31.229/download/EnergyBiz_Smart_Building_Op_Ed_Final_v2.doc) .  
 Smart Electric Grid of the Future, <http://www.earth.columbia.edu/news/2003/story09-23-03.html>  
 Computational Learning Systems, <http://www.ccls.columbia.edu/>  
 Urban Energy Management, <http://www.earth.columbia.edu/news/2003/story09-23-03.html>  
 Urban Infrastructure Management, <http://uuc1.poly.edu/>  
 Computer Aided Lean Management, [http://www.amazon.com/Computer-Aided-Lean-Management-Energy-Industry/dp/1593701578/ref=sr\\_1\\_1?ie=UTF8&s=books&qid=1263506924&sr=8-1](http://www.amazon.com/Computer-Aided-Lean-Management-Energy-Industry/dp/1593701578/ref=sr_1_1?ie=UTF8&s=books&qid=1263506924&sr=8-1)  
 Simulations of Threats to Critical Urban Infrastructure,  
[http://www.energypulse.net/centers/article/article\\_display.cfm?a\\_id=31](http://www.energypulse.net/centers/article/article_display.cfm?a_id=31)  
 Alternative Energy Systems, <http://www.rrc.state.tx.us/about/tepc/071604meeting.html>  
 4D Oil & Gas Exploration and Production, <http://www.ces-enterprise.com/vpatch/bp/attachments/handbook/index.html> .  
 Gravity Gradiometry, <http://www.earthinstitute.columbia.edu/news/2005/story03-01-05.html>  
 Scientific Wireline Logging, Permeability Testing, Hydraulic Fracturing, and Stress Testing,  
<http://www.ldeo.columbia.edu/BRG/>

### **EDUCATION:**

Ph.D. Oceanography, Scripps Institution of Oceanography, University of California, San Diego, 1973.  
 M.S. Geophysics, University of Oklahoma, thesis at Woods Hole Oceanographic Institution, 1971.  
 B.S. Geophysics, University of Oklahoma, 1969.

### **PERMANENT POSITIONS:**

President & CEO, AKW Analytics Inc., 2014-  
 Columbia University, Principal Investigator, Finmeccanica Selex Eltag-Rudin Management  
 Smart Property Management System, 2012-2015  
 Columbia University, Principal Investigator, Fedex-GE-Con Edison Smart Electric Delivery Vehicle  
 Deployment System, 2011-2014

Columbia University, Principal Investigator, Edison Program with Con Edison, 2006-2011.  
 Columbia University, Senior Research Scientist, Center for Computational Learning Systems, SEAS, 2006-2015 (Ret)  
 Columbia University, Adj. Professor, Dept Earth and Environmental Sciences, 1978-2015.  
 Columbia University, Lamont-Doherty Earth Observatory, Sr. Research Scientist, 1978-2006.  
 Founder and Former Director, Lamont Doherty Borehole Research Group, 1989-1999.  
 Founder and Director of the Lamont 4D Technology Group, 1999-2007.  
 Founder and Director, Lamont Energy Research Group, 2003-2010.  
 Marine Physical Laboratory, Scripps Institution of Oceanography, University of California, San Diego, Assistant Research Geophysicist, 1973-1974.  
 Research Associate, Lamont-Doherty Geological Observatory, Columbia University, 1974-1978.  
 Board-of-Directors, CALM Energy, Inc. 2005-2007, 2014-.  
 Board-of-Directors, Bell Geospace, Inc, 1994-1999.  
 Chairman of the Board-of-Directors, vPatch Technologies, Inc. 2000-2002.

### **VISITING POSITIONS:**

Visiting Engineer, Rudin Management, New York, NY 2012-16.  
 Visiting Engineer, Consolidated Edison, New York, NY, 2004-2015.  
 Visiting Scientist, Texas Energy Center, Houston, TX, 2003-2004.  
 Visiting Scientist, The Boeing Company, Houston, TX, 2000-2003.  
 Visiting Scientist, Western Geophysical, Houston, TX, 1997-1999.  
 Visiting Scientist, Shell Exploration Production Technology Center, Bellaire, TX, 1995-1996.  
 Visiting Scientist, Pennzoil Exploration Production Co., Houston, TX, 1991-1994.  
 Visiting Scientist, Kansas Geological Survey, Lawrence, Kansas, 1986.  
 Visiting Scientist, United States Geological Survey, Menlo Park, CA, 1982.  
 Visiting Scientist SUNY, Albany NYm 1980.  
 Visiting Scientist, Earthquake Research Institute, University of Tokyo, Japan, 1978.  
 Visiting Scientist, Institute of Geophysics, University of Hawaii, 1973.  
 Visiting Scientist, Theoretical Geochemistry Group, University of California, Berkeley, 1972.  
 Research Fellow, Woods Hole Oceanographic Institution, 1969-1970.  
 Summer Fellow, Woods Hole Oceanographic Institution, 1968.  
 Research Assistant, Sinclair Oil & Gas Co., Lafayette, Louisiana, 1967.

### **LEADERSHIP:**

Roger is President and CEO of the Big Data Analytics company AKW Analytics Inc. Roger leads a team of 10+ data scientists and software engineers that developed and are selling the patented Petroleum Analytics Learning Machine™ (PALM) as Software as a Service (SaaS) in the Exploration and Production business, both conventional and unconventional (Shale Oil & Gas). Roger is AKW's resident Hydraulic Fracturing expert, having frac'ed more than 100 wells in his lifetime and analyzed thousands of frac stages in hundreds of horizontal shale wells. <http://AKWanalytics.com> .

Roger co-founded CALM Energy Inc. and CALM Water Inc. spinouts from Columbia University Ventures in 2005, <http://www.CALMEnergyInc.com> .

Roger developed business plans for Boeing Energy Systems at Clear Lake, TX, in collaboration with BP and KBR from 2000-2003. <http://leanenergy.ideo.columbia.edu> .

Roger co-Founded the Bell Geospace, Inc. with Robin Bell and Lincoln Pratson. Bell Geospace is a Joint Venture between Columbia University, ARCH Venture Partners (an investment fund begun at Argonne National Laboratories and the University of Chicago, (see Fortune magazine, 1998). Bell Geospace holds exclusive licenses to oil industry applications of the Bell Aerospace Gravity Gradiometry System (see Scientific American, June, 1998). Bell (now a division of Lockheed/Martin) is the inventor of these highly innovative, stealth navigation devices for the

Trident Submarine program, <http://www.bellgeo.com> .

Roger was Principal Investigator of the only university proposal selected for the GE Ecomagination Challenge Innovation Prize. The international competition was one of the largest of its kind, a 10-week open innovation Challenge that received nearly 4,000 ideas from start-up companies, emerging and established businesses, and universities in more than 150 countries. The citation awarded more than \$1.1 million dollars to the Fu Foundation School for Engineering and Applied Science, Columbia University, New York, NY for new innovative control of EV Charging Stations. A new collaboration with GE, Columbia Engineering, Federal Express, and Con Edison to enable the conversion from hydrocarbon to electric delivery vehicles in New York City. Columbia's technology manages load and delivery and links electrical vehicle charging stations to the utility's electric distribution management system in real-time. In addition to providing funding, GE will supply expertise from its Digital Energy division and GE's Global Research Center to support this program. <http://engineering.columbia.edu/smart-grid-project-wins-ge-grant> .

Roger invented and managed SEISRES, an integrated team of his 4D Technology Group with 4 employees from Western-Atlas, 2 from IBM's Thomas Watson Research Laboratory at Yorkville Heights, NY, and several contract researchers from 1996 through 1999. The team worked on a 3-year, \$4 million computational development project funded by Baker-Hughes International to couple computational inversion, seismic reservoir modeling and simulation software into a command-and-control environment for efficient drainage of hydrocarbons and other fluids from subsurface oil and gas reservoirs, <http://leanenergy.ldeo.columbia.edu> .

Roger managed a team of 10 software developers that created more than 500,000 lines of code relating to new and novel methods for processing and interpretation of 4-D seismic data in the early 1990's. 3 patents for this and associated invention's, were licensed by Columbia to Baker Hughes International in 1996. <http://leanenergy.ldeo.columbia.edu> .

Roger put together an Innovation Team from Columbia's CCLS, Selex Elsag, subsidiaries of Italy's second largest conglomerate Finmeccanica (FNM), and Rudin Management, the largest private owner of large office buildings (>200,000 sq. ft.) in Manhattan. The team is developing a Smart Property Management System that will incorporate the CCLS Total Property Optimizer. FNM will market the product suite worldwide beginning in 2013., <http://blogs.ei.columbia.edu/2013/08/16/38968/> , <http://www.marketwatch.com/story/rudin-management-to-roll-out-energy-saving-di-bosstm-building-operating-system-after-successful-pilot-study-2013-07-31> , , <http://engineering.columbia.edu/innovative-building-operating-system-provides-brain-smarter-cities> .

Roger was Proposal Manager and Principal Investigator of Columbia's participation in the 2010-2012 Secure Interoperable, Open Smart Grid Demonstration Project, a \$94 million/3 year program funded by the Department of Energy and the New York Public Service Commission. Partners include Con Edison as the prime contractor, and the Boeing Company, CALM Energy, The Prosser Group, New York Economic Development Corp, Viridity Energy, Rudin Management, and Verizon Business, <http://www.earth.columbia.edu/news/2003/story09-23-03.html> .

Roger led a team of from 10 to 15 scientists, engineers and graduate students at Columbia developing software for control of the smart electric grid of New York City as part of the Edison Project with Con Edison since 2003. In addition, the joint team has improved the performance of the existing New York City underground distribution system by more than 20%. Software code capital expensed at >\$10,000,000 has been delivered via Columbia's Technology Ventures office to Con Edison since December, 2005. Con Edison has realized a Return-On-Investment (ROI) of more than 4:1 from this investment, so far. Sixteen patents have been generated, with 3

jointly owned by Columbia University and Con Edison. Winning the DOE Smart Grid Stimulus Demonstration is directly attributed by Con Edison to the successful team brought to Con Edison by Roger (John Miksad, Executive VP). <http://www.earth.columbia.edu/news/2005/story06-01-05e.html> .

Roger published a White Paper on the Smart Electric Grid while at the Texas Energy Center in Houston, TX with Nobel Prize winners Rick Smalley of Rice University and Paul Chu of the University of Houston in 2003-2004. <http://leanenergy.ldeo.columbia.edu> .

Roger co-Founded the Lamont's Portfolio Management (PM) Consortium with John Howell, former executive of Shell Oil Company. PM specialized in portfolio management services for oil, gas and electric company decision makers. PM's specialty is the development of human interaction technologies that allow a company to optimize their upstream business metrics (growth, profit, net present value mix) through interaction with their property portfolio, <http://leanenergy.ldeo.columbia.edu> .

Roger co-Founded the Lamont/Penn State 4D Seismic Monitoring Consortium with Penn State University, that assembled and managed research into the techniques for tracking drainage of oil and gas in several offshore oil fields in the Gulf of Mexico and North Sea, <http://leanenergy.ldeo.columbia.edu> .

Roger was the Principal Investigator, Department of Energy's "Dynamic Enhanced Recovery" Project from 1991-1994. Roger supervised a \$20 million cost-sharing project with industry in which he directed three Ph.D. scientists, a Petroleum Engineer and two computer visualization professionals, 3 Ph.D. students and several support personnel at Lamont, as well as scientists at 6 university, 4 service companies, and Pennzoil Exploration and Production Co., in the drilling, logging and testing of an experimental well into an active fault system in the Gulf of Mexico, <http://www.gulfbase.org/organization/view.php?oid=gbrn> .

Roger co-Founded the Global Basins Research Network, with Lawrence Cathles of Cornell University. GBRN is an Internet consortium of 6 universities and several computer and software companies. The GBRN is an Internet organization for the description and overall process modeling of hydrocarbon and mineral formation and migration in sedimentary basins, <http://www.gulfbase.org/organization/view.php?oid=gbrn> .

Roger was the Principal Investigator for Wireline Logging of Deep Observation and Sampling of the Earth's Continental Crust, with Mark Zoback of Stanford University. This initial effort grew into the SAFOD project to drill and instrument the San Andreas Fault via a Research Drillhole in California. This well is testing the forces that are driving the San Andreas Fault at great depth, [http://earthquake.usgs.gov/research/parkfield/safod\\_pbo.php](http://earthquake.usgs.gov/research/parkfield/safod_pbo.php) .

Roger was the Principal Investigator: Naval Undersea Laboratory, New London Connecticut, to develop subsurface electrical images of the continental margins for the United States Navy. We investigated new methods to better image the geological structure of the continental margins through the instrumentation of deep, offshore boreholes.

Roger also was a Consultant to the Director of the IBM Watson Research Laboratory (1993-94), Yorktown Heights, NY. He assisted in the planning for conversion of Physical and Numerically Intensive Computing projects into the Worldwide Chemicals, Petroleum & Mining Research Division within Business Analytics and Mathematical Sciences.

Roger founded and led from 1984 to 1994 the Borehole Research Group at the Lamont-Doherty Earth Observatory. He was Principal Investigator of the wireline logging program for the Scientific Ocean Drilling Project, and Schlumberger's largest offshore U.S. client during this

time. His team developed a subsurface straddle-packer system for permeability and pore pressure measurement so that new technologies for predicting hydraulic permeability from acoustic permeability could be tested, <http://www.ldeo.columbia.edu/BRG/> .

Roger also was Principal Investigator for an IBM-Supported Research Program to Study Ground Water Hydrology beneath the world's largest microprocessor assembly plant in Fishkill, New York.

Roger was the co-director of the Lamont-Doherty Earth Observatory Heat Flow Group with Marcus Langseth from 1974 to 1984. Lamont's ocean research ship is now named after Marcus. [http://en.wikipedia.org/wiki/RV\\_Marcus\\_Langseth](http://en.wikipedia.org/wiki/RV_Marcus_Langseth) .

### **SCIENTIFIC AND ENGINEERING PUBLICATIONS:**

For continuously updated list, go to Roger N. Anderson in [Scholar.Google.com](http://Scholar.Google.com)

[https://scholar.google.com/citations?hl=en&user=OKv6LbwAAAAJ&view\\_op=list\\_works&sortby=pubdate](https://scholar.google.com/citations?hl=en&user=OKv6LbwAAAAJ&view_op=list_works&sortby=pubdate)

### **PATENTS GRANTED:**

1. Anderson, R.N., Hobart, M.A., and Van Steveninck, W., EXPLORING FOR SUBSURFACE HYDROCARBONS BY SEA-FLOOR TEMPERATURE GRADIENTS, **United States Letters Patent 4,676,664**. Australian patent No. 572,544 issued 1988. Canadian patent No. 1,219,078 issued 1987.

<http://www.freepatentsonline.com/4676664.html> .

2. Anderson, R.N., METHOD FOR MONITORING TEMPERATURE-VS-DEPTH CHARACTERISTICS OF HYDRAULIC FRACTURING IN A BOREHOLE, **United States Letters Patent 4,832,121**.

<http://www.wipo.int/pctdb/en/wo.jsp?IA=US1988003263> .

3. Anderson, R.N. and Williams, C.F., WELLBORE HEAT FLOW DETERMINATION FOR THE LOCATION OF HYDROCARBONS, **United States Letters Patent 4,947,682**.

<http://www.freepatentsonline.com/4947682.html> .

4. Anderson, R.N. and He, W., DETECTION OF THE TOP-OF-GEOPRESSURE SURFACE FROM A NOVEL SEISMIC ATTRIBUTE ANALYSIS TECHNIQUE: "CEPSTRUM" REFLECTION STRENGTH MAPPING, **United States Letters Patent 5,311,484**.

<http://www.patentstorm.us/patents/5311484.html> .

5. Anderson, R.N. Boulanger, A., Bagdonas, E.P., He, W., Sun, Y.F., and Xu, L., METHOD FOR IDENTIFYING SUBSURFACE FLUID MIGRATIONAL PATHWAYS USING 3-D AND 4-D SEISMIC IMAGING, **United States Letters Patent 5,586,082**.

<http://www.freepatentsonline.com/EP0812429.html> .

6. R. N. Anderson, and He, W., 4-D SEISMIC INVERSION FOR OIL AND GAS PRODUCTION MONITORING, **United States Letters Patent 5,798,982**.

<http://www.freepatentsonline.com/EP0896677.html> .

7. Anderson, R.N., Boulanger, A., Mello, U., He, W., Winston, J., Wiggins, W., and Xu, L., PETROLEUM RESERVOIR SIMULATION AND CHARACTERIZATION SYSTEM AND METHOD, **United States Letters Patent 6,826,483**. Australian Patent Number 572,544, Canadian Patent No. 1,219,078.

<http://www.google.com/patents?hl=en&lr=&vid=USPAT6826483&id=pH4SAAAAEBAJ&oi=fnd&dq=%22ANDERSON,+ROGER+N%22&printsec=abstract#v=onepage&q=&f=false> .

8. Anderson, R.N., and Boulanger, A., INNERVATED STOCHASTIC CONTROLLER FOR REAL TIME BUSINESS DECISION-MAKING SUPPORT, **United States Letters Patent 7,395,252**.  
<http://www.google.com/patents?hl=en&lr=&vid=USPAT7395252&id=qDCrAAAAEBAJ&oi=fnd&dq=%22ANDERSON,+ROGER+N%22&printsec=abstract#v=onepage&q=&f=false> .

9. Anderson, R.N., Boulanger, A., Waltz, D.L., Long, P., Arias, M., Gross, P., Becker, H., Kressner, A., Mastrocinque, M., Koenig, M., Johnson, J.A., SYSTEM AND METHOD FOR GRADING ELECTRICITY DISTRIBUTION NETWORK FEEDERS SUSCEPTIBLE TO IMPENDING FAILURE, **United States Letters Patent 7,945,524**.  
<http://www.google.com/patents?vid=7945524&printsec=overview> .

10. Anderson, R.N., Boulanger, A., Long, P.M., Servedio, R.A., SYSTEMS AND METHODS FOR MARTINGALE BOOSTING IN MACHINE LEARNING, **United States Letters Patent 8,036,996 B2**.  
<http://www.google.com/patents?vid=8036996&printsec=overview> .

11. Anderson, R.N., Boulanger, A., He, W., Mello, U., Xu, L., MARTINGALE CONTROL OF PRODUCTION FOR OPTIMAL PROFITABILITY OF OIL AND GAS FIELDS, **United States Letters Patent Number 8,560,476**.  
<https://www.google.com/patents/US8560476?dq=8560476&hl=en&sa=X&ei=iqVtUpHICrar4AOvjHADA&ved=0CDcQ6AEwAA> .

12. Anderson, R.N., Blick R., Boulanger, A. Chow, M. Mastrocinque, M., CONTINGENCY ANALYSIS TOOL FOR ELECTRIC DISTRIBUTION GRID MANAGMENT, **United States Letters Patent 8,583,405 B2**.  
<http://www.google.com/patents/US8583405> .

13. Anderson, R.N., Boulanger, A., and Chow, M., CAPITAL ASSET PLANNING SYSTEM, **United States Letters Patent 8,725,625**.  
<http://www.google.com/patents/US8725625> .

14. Anderson, R.N., Boulanger, Albert G.; Wu, Leon, METRICS MONITORING AND FINANCIAL VALIDATION SYSTEM (M2FVS) FOR TRACKING PERFORMANCE FROM CAPITAL OPERATIONS, AND MAINTENANCE INVESTMENTS DURING SMART GRID MANAGEMENT OF ELECTRIC TRANSMISSION AND DISTRIBUTION SYSTEMS, **United States Letters Patent 8,725,665**.  
<https://www.google.com/patents/US8725665?dq=8725665&hl=en&sa=X&ei=YIzJU4G8KliSyASc-oCQBg&ved=0CB4Q6AEwAA> .

15. Anderson, R. N., Boulanger, Albert; Rudin, Cynthia; Waltz, David L.; Salieb- Aouissi, Ansaf; Chow, Maggie; Dutta, Haimonti; Gross, Phil; Huang, Bert; Jerome, Steve; Isaac, Delfina; Passonneau, Rebecca J.; Radeva, Axinia; Wu, Leon L.; Kressner, Artie, MACHINE LEARNING FOR POWER GRIDS, **United States Letters Patent 8,751,421**.  
<https://www.google.com/patents/US8751421?dq=8751421&hl=en&sa=X&ei=pIzJU6m0KcqxyATf74HYCA&ved=0CB4Q6AEwAA> .

16. Anderson, R.N., Boulanger, A., Blick, R., Gross, P., Kressner, A., Mastrocinque, M., DECISION SUPPORT CONTROL CENTERS, **United States Letters Patent 8,972,066 B2**.  
<http://www.wipo.int/patentscope/search/en/WO2009117741> .

17. Anderson, R.N., Boulanger, A. Johnson, J., DYNAMIC CONTINGENCY AVOIDANCE AND MITIGATION SYSTEM, **United States Letters Patent 9,395,707 B2**.  
[http://worldwide.espacenet.com/publicationDetails/biblio?DB=EPODOC&II=0&adjacent=true&locale=en\\_EP&FT=D&date=20100826&CC=WO&NR=2010096783A1&KC=A1](http://worldwide.espacenet.com/publicationDetails/biblio?DB=EPODOC&II=0&adjacent=true&locale=en_EP&FT=D&date=20100826&CC=WO&NR=2010096783A1&KC=A1) .

#### PATENTS APPLIED FOR:

1. Anderson, R.N., A. A. Kressner, L. Wu, B. Xui, PETROLEUM ANALYTICS LEARNING MACHINE™ (PALM™) WITH MACHINE ANALYTICS PRODUCTS (MAP™) FOR THE UPSTREAM AND MIDSTREAM OIL AND GAS INDUSTRY, **PCT Patent Application US 15/409,425, October, 2015 (Published 12/21/2017)**.  
<http://pdfaiw.uspto.gov/.aiw?PageNum=0&docid=20170364795&IDKey=6A0C72997F16&HomeUrl=http%3A%2F%2Fappft.uspto.gov%2Fnetacgi%2Fnph-Parser%3FSect1%3DPTO1%2526Sect2%3DHITOFF%2526d%3DPG01%2526p%3D1%2526u%3D%25252Fnetahhtml%25252FPTO%25252Fsrchnum.html%2526r%3D1%2526f%3DG%2526l%3D50%2526s1%3D%25252220170364795%252522.PGNR.%2526OS%3DDN%2F20170364795%2526RS%3DDN%2F20170364795> .

#### COMPUTATIONAL LEARNING SYSTEMS© AVAILABLE FOR NON-EXCLUSIVE LICENSING FROM COLUMBIA TECHNOLOGY VENTURES: <http://techventures.columbia.edu/industry/start-licensing-process>

1. Anderson, R.N., Boulanger, A., Powell, W., Jeong, V., Defourny, B., Simao, H., ADAPTIVE STOCHASTIC CONTROL FOR LOAD AND SOURCE CONTROL, **United States Letters Patent Application, issued August, 2011**.  
<https://docs.google.com/file/d/0B7Am-1xPqJfYcWkzVTFwR1ICcWM/edit?usp=sharing&pli=1>
2. Anderson, R. N.; Wu, Leon L.; Boulanger, Albert; Winter, Rebecca; Solomon, David; Gilbert, John J.; Boniberger, Eugene M.; Kressner, Arthur A., ADAPTIVE STOCHASTIC CONTROLLER FOR ENERGY EFFICIENCY AND SMART BUILDINGS, **PCT Patent Application 070050.4640, issued Sept 20, 2012**.  
<https://docs.google.com/file/d/0B7Am-1xPqJfYQnNJQnAyRTBHMfK/edit?pli=1> .
3. Anderson, R.N., Boulanger A., Bhandari V., Gagneja A, Kressner K, Solomon, D., Wu Leon, FORECASTING SYSTEM USING MACHINE LEARNING AND ENSEMBLE METHODS, **United States Letters Patent Application, US2013/069,762, November, 2012**.  
<http://www.google.com/patents/WO2014075108A2?cl=en> .
4. Anderson, Roger N., Albert Boulanger, and Arthur A. Kressner, ADAPTIVE STOCHASTIC CONTROLLER FOR DISTRIBUTED ELECTRICAL ENERGY STORAGE MANAGEMENT. **United States Letters Patent Application. European Patent Application EP 2,539,725, January, 2013**.  
<http://www.google.com/patents/WO2011106519A1?cl=en>
4. Anderson, R.N., Boulanger, A., Wu, Leon, Mcinerney, K., Teravainen, T., Chakraborty, B., ADAPTIVE STOCHASTIC CONTROL FOR DYNAMIC TREATMENT OF CYBER-PHYSICAL SYSTEMS, **WIPO Patent Application 2013023178, February, 2013**.  
<https://www.google.com/patents/WO2013023178A1?cl=en&dq=PCT/US12/050439&hl=en&sa=X&ei=cxZgUuzxO5H64AOe4IAQ&ved=0CDkQ6AEwAA>
5. Anderson, R.N., Boulanger A., Bhandari V., Gagneja A, Kressner K, Sarkar S., Wu Leon, Li X, MACHINE LEARNING FORECASTING SYSTEM FOR DISTRIBUTION FACILITY BUILDING LOADS AND ELECTRIC DELIVERY VEHICLE CHARGING, **United States**



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22. Anderson, R.N., L. Cathles, B. Land, and J. Tam, Imaging of Present-day Hydrocarbon Migration, *Frontiers*, Vol. 8, July, 1992.
23. Lawrence, D.T. and Anderson, R.N., Details Confirm Gulf of Mexico Deepwater as Significant Province, *Oil & Gas Journal*, May 24, 1993.
24. Durham, L. Anderson, R.N., Futuristic Play Concept Scheduled for on-line Test in Gulf of Mexico, *Oil and Gas World*, November, 1993.
25. Anderson, R.N., Deep Potential of the Gulf of Mexico, *Amer Oil Gas Reporter*, Feb. 1994.
26. Durham, L. Anderson, R.N., Finding a Field of Streams, *AAPG Explorer*, May, 1994.
27. Cronin, M. Anderson, R.N., *GBRN, Doing Business on the Internet*, Van Nostrand Reinhold, 1994.
28. Anderson, R.N., Production Operations Moving to 5-D, *Am. Oil and Gas Reporter*, Feb. 1996.
29. Boulanger A., Anderson R.N., Barger J., Reservoir Management in the Future, *Am Oil and Gas Reporter*, July, 1996.
30. Anderson R.N., Lamont 4-D Software integrated into Western's software family to reduce 4-D project cycle time, *InDepth*, Sept. 1997.
31. Bell, R., Anderson R.N., and Pratson L., Gradiometry spinning into Gulf Trends, *Am Oil and Gas Reporter*, Feb. 1997.
32. Stipp, D. and Anderson, R.N., Extreme Venture Capital, *Fortune*, October 26, 1998.
33. Anderson, R.N., Oil & Gas Investor, 4D Seismic Software Puzzle, January 28, 1998.
34. w/ Christopher Cooper, No Crude Joke: This Oil Field Grows Even as its Tapped, *Wall Street Journal*, March 16, 1999.
35. w/ Williams, P., 4-D Seismic: Holding the Line, *Oil & Gas Investor*, May, 1999
36. w/ Rist, C., Why We'll Never Run out of Oil, *Discover*, June, 1999
37. w/ Mello, U., IBM Research, Quest for Oil, March 15, 2000
38. w/ Usher, C., 'E-Reservoir' Part of New World Order, *American Oil & Gas Reporter*, January, 2000.
39. Anderson, R.N., Wattage Where Its Needed, *The New York Times*, Op-Ed, June 6, 2001.
40. w/ Vaitheeswaran, V., Into Deep Water, *The Economist*, 2001.
41. w/ Fisher, D. Going Deep, *Forbes*, April, 2001
42. Anderson, R.N., Power Shortage, *CIO Insight*, July, 2002.
43. w/ Lindorff, D., The Intelligent Grid, *CIO Insight*, July, 2002.
44. w/ Locke, C., SuperGrid, *Red Herring*, July, 2002.
45. w/ Vaitheeswaran, V., Call Hellfighters, *The Economist*, March 15, 2003.
46. R.N. Anderson, The Smart Electric Grid, *Columbia Record*, October 10, 2003.
47. w/ Vaitheeswaran, V., America's Electricity Crisis, *The Economist*, August 23, 2003.
48. w/ Vaitheeswaran, V., Anderson, R.N., Building the Energy Internet, *The Economist*, March 11, 2004.
49. in *National Geographic*, The End of Cheap Oil, June, 2004.
50. w/ Vaitheeswaran, V. *The Economist Oil Survey of 2005*, April 14, 2005.
51. Anderson, R.N., *Scientific American*, Why is Oil Found in Deserts and Arctic Areas, Ask the Experts, p. 104, April, 2006.
52. w/ Rosenburg, E. Proactive Maintenance, *EnergyBiz*, March, 2007.
53. Anderson, R.N., A. Kressner, J. Gilbert, Smart High-Rises, *EnergyBiz*, July/August, p. 20, 2012.

#### **VIDEO PUBLICATIONS:**

1. Anderson, R.N., Basins as Dynamic Systems, *GBRN*, Video 1991.
2. Anderson, R.N., Lytle, W., Global Basins Research Network, *GBRN*, Video 1992.
3. Anderson, R.N., Nelson, R., Warner, C., Dynamic Enhanced Recovery Technologies, Video *GBRN*, 1992.
4. Anderson, R.N., Bagdonas, E., and Reynolds, R., Fluid Migration in the Eugene Island 330 Field, Offshore Louisiana, Video *GBRN*, 1993.

5. Anderson, R.N. and N. Connor, Field of Streams, Houston Museum of Natural History, shown in the Weiss Energy Hall, Video 1996-8.
6. Trom, J., Bernhardt, P., and Anderson, R., Oil Formation, playing in the Weiss Energy Hall, Houston Museum of Natural History, Video 1999-.
7. ABC and Discovery News: Solutions: 4-D seismic sensing, playing in the Weiss Energy Hall, Houston Museum of Natural History, Video 1999-2010.
8. Anderson, R.N., A. Boulanger, 4-D Seismic Reservoir Simulation, R.P.D. Productions, Video 1998.
9. Anderson, R. N. Technical Consultant, **Anatomy of a Blackout**, NBC News/Discovery Channel, Video 2003.
10. ABC Nightline: Oil Fires of Iraq, Video May, 2004.
11. Discovery Channel, Katrina and the Economy, Video Sept, 2005.
12. The Boeing Company, The Cyber Secure Smart Electric Grid, Video March, 2009.
13. The Boeing Company, Smart Grid Demonstration, Video Sept, 2009.
14. Anderson, R. N. Technical Consultant, BBC/WGBN, **Hurricane Sandy: Inside the Mega-Storm**, Video Nov, 2012
15. Rudin Management, Anderson, R.N., Skyscrapers and the Internet of Things, Video, Intel, 2015.

#### TEACHING AT COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK:

- 1978 – 2015, Creator of EESC V1053, **Planet Earth**, Columbia College Science Requirement.
- 2001-2005, Co-Creator of SIPA W4300, **Alternative Energy Resources**, Columbia University School of International and Public Affairs.

#### COLUMBIA PH.D.'S GRANTED UNDER ROGER'S DIRECTION:

1982 **Dallas Abbott**  
Adjunct Research Scientist  
Lamont Doherty Earth Observatory  
Columbia University  
Palisades, New York

1984 **Carol Stein (nee Geller)**  
Professor  
Dept of Sciences  
University of Illinois, Chicago  
Visiting Professor  
Northwestern University  
Chicago, Illinois

1985 **Robin Newmark**  
Associate Director for Earth Sciences  
Lawrence Livermore Laboratory  
U.S. Department of Energy  
Livermore, California

1985 **David Goldberg**  
Lamont Research Professor and Associate-Director  
Lamont-Doherty Earth Observatory, and  
Director  
Borehole Research Group

Columbia University  
Palisades, New York

1989 **Colin Williams**  
Senior Scientist and Director Geothermal Research  
United States Geological Survey  
Menlo Park, California

1990 **Philippe Pezard**  
Director  
Borehole Research Group  
Marseilles Institute of Technology/CNRS  
Marseilles, France

1994 **Ulisses Mello**  
Director  
IBM Research Center  
San Paolo, Brazil

1996 **Wei He**  
IT Coordinator  
Trading Floors  
Citicorp  
New York, NY

1996 **Liqing Xu**  
Sr Risk Analyst  
PEMCO  
New York, NY

2000 **Guilles Guerin**  
Research Scientist  
Borehole Research Group  
Lamont-Doherty Earth Observatory  
Palisades, New York

2015 **Leon Wu**  
Co-Founder and CTO  
AKW Analytics  
New York, NY

#### **FIELD PROJECTS:**

- 2011-2015 Rudin Management, Selex, Di-BOSS, Digital Building Operating System, 345 Park Avenue, NY.
- 2004-2011 Decision Aids Desk at the Manhattan Electric Control Center, Con Edison, 4 Irving Place, and Brooklyn/Queens Control Center, Flatbush Ave, Brooklyn, NY.
- 2004-2006 Con Edison Cable and Splice Center of Excellence, Van Nest, Bronx, NY
- 1996-1998 South Timbalier 295, 4D Seismic Monitoring, offshore Louisiana, with Shell, Inc.
- 1996-1998 Vermillion 39 Field 4D Seismic Monitoring Project, with Unocal, Lafayette, La.
- 1995-1996 Perdido BAHA Ultra-deepwater Drilling Project, offshore Texas. VSP Inversion Project analysis with Shell Offshore, Inc., and funded by LLL, DOE.
- 1992-1994 Eugene Island Block 330 Field Demonstration drilling program and 4D seismic monitoring project. Sited and supervised all aspects of Pennzoil well A20-ST and



- slim-hole deepening of A10-ST. Included coring, logging, testing, and hydraulic “frac-pack” fracturing.
- 1992-1994 4-D Seismic Analysis sited A8-ST in EI Block 338, which has produced more than 1000 bbl/d since.
- 1989 Toa Baja, Puerto Rican Power Authority exploration well for natural gas (in collaboration with Dave LaRue, Exxon), Scientist-in-charge of logging operations.
- 1987-1988 Cajon Pass, Continental Scientific Drillhole into the San Andreas Fault (with Mark Zoback, Stanford), in-charge of logging operations.
- 1987 Moodus, Connecticut, Empire State Electrical Energy Research Corporation well to test the state-of-stress near the Connecticut Yankee Nuclear Power Plant, (with Mark Zoback, Stanford), in-charge of logging operations.
- 1986 Kent Cliffs, New York, Empire State Electrical Energy Research Corporation well to test the state-of-stress near the India Point Nuclear Power Plant, (with Mark Zoback, Stanford), in-charge of logging operations.
- 1985 Westminster, South Carolina, Appalachian Deep Scientific Drilling Project, National Science Foundation sponsored project to drill into the Appalachian trust belt, (with Mark Zoback, Stanford), in-charge of logging operations.
- 1984 Laredo, Texas, Cox Petroleum Exploration Well, El Gatita #1, Joint Cox/Halliburton Well Services test of new Hydraulic Fracture orientation techniques, hydraulic fracture scientist.
- 1982 Oroville, California, United States Geological Survey well to test the state-of-stress near the Oroville Reservoir after the 1975 Oroville earthquake, (with Mark Zoback, Stanford).
- 1981 Auburn, New York, Empire State Geothermal Power Research Project well to test deeply-buried, hot water for power production, (with Mark Zoback, Stanford).

**CHIEF SCIENTIST OF THE FOLLOWING CRUISES ABOARD OFFICE OF NAVAL RESEARCH AND NATIONAL SCIENCE FOUNDATION SHIPS**

1981	Rama 10, R.V. WASHINGTON	Mariana Trough, Pacific Ocean
1980	Cruise 36, Leg 6, R.V. VEMA	South China Margin, Pacific Ocean
1979	Cruise 22, Leg 5, R.V. CONRAD	Guatemala Basin, Pacific Ocean
1978	Mariana, Leg 4, R.V. WASHINGTON	Mariana Trough, Pacific Ocean
1977	Cruise 34, Leg 8, R.V. VEMA	Crozet Basin, Indian Ocean
1976	Cruise 20, Legs 6 & 7, R.V. CONRAD	Philippine Sea Basin, Pacific Ocean
1975	Cruise 33, Leg 2, R.V. VEMA	Southeast Indian Ridge, Indian Ocean
1974	Cocotow, Leg 4, R.V. MELVILLE	Galapagos Ridge, Pacific Ocean
1973	Tasaday, Leg 8, R.V. WASHINGTON	Mariana Trough, Pacific Ocean
1972	Southtow, Leg 8, R.V. WASHINGTON	East Pacific Rise, Pacific Ocean

**SCIENTIST ABOARD THE FOLLOWING CRUISES ABOARD OFFICE OF NAVAL RESEARCH AND NATIONAL SCIENCE FOUNDATION SHIPS**

- 1975 R.V. JEAN CHARCOT, CNEXO, Brest, France: Bay of Biscay study, Atlantic Ocean, Heat Flow Scientist.
- 1972 R.V. WASHINGTON, Southtow, Leg 7, Joint Woods Hole-Scripps study of the Galapagos Spreading Center, Pacific Ocean, Heat Flow Scientist
- 1970 R/V ATLANTIS II, Cruise 54, Woods Hole Oceanographic Institution, Galapagos and Eastern Pacific Spreading Centers, Heat Flow Scientist.

**CO-CHIEF SCIENTIST ABOARD THE FOLLOWING OCEAN DRILLING**

**PROJECT CRUISE:**

1982 D.V.GLOMAR CHALLENGER, Leg 83. Costa Rica Rift, Pacific Ocean Co-Chief scientist

**SCIENTIST ABOARD THE FOLLOWING OCEAN DRILLING PROJECT CRUISES:**

1986 D.V. JOIDES RESOLUTION, Leg 111, Costa Rica Rift, Pacific Ocean, Logging Scientist

1985 D.V. JOIDES RESOLUTION, Leg 101, Bahama Platform, Atlantic Ocean, Logging Scientist

1983 D.V. GLOMAR CHALLENGER, Leg 92, Costa Rica Rift, Pacific Ocean, Drill-Stem-Test Scientist

1979 D.V. GLOMAR CHALLENGER, Leg 69 Costa Rica Rift, Pacific Ocean, Drill-Stem-Test Scientist

1979 D.V. GLOMAR CHALLENGER, Leg 68 Costa Rica Rift, Pacific Ocean, Drill-Stem-Test Scientist

**CRUISE COORDINATOR:**

1973-4 Tasaday Expedition, Scripps Institution of Oceanography

1972-3 Iguana Expedition, Scripps Institution of Oceanography

**U. S. DEPARTMENT OF DEFENSE SECURITY CLEARANCE:** Secret (retired)

**TV ANALYSES:**

ABC Nightly News

ABC Nightline

Bloomberg Television

Canadian Broadcasting System

CNN

PBS

CNNfn

NY1

BBC/PBS

**KEYNOTE PRESENTATIONS:**

1. Tectonic Processes of the Cocos Plate, International Geological Congress, Mexico City, 1973.
2. Intermediate Wavelength Magnetic Anomalies in the Ocean Basins, Chapman Conference on Long Wavelength Magnetic Anomalies, American Geophysical Union, Colorado Springs, CO, 1975.
3. Subduction Processes and Dehydration, International Union of Geodesy and Geophysics, Tokyo, 1978.
4. Chemical Effects of Subduction, American Geophysical Union, Special Session on Subduction Processes, Washington, D.C., 1979.
5. Physics and Chemistry of Ridge Axis Processes, NATO Conference, Cambridge, England, 1982.

6. Scientific Well Logging, Continental Scientific Drilling, American Institute of Mining Engineers, New York, 1984.
7. Conference Organizer for New Techniques in Scientific Well Logging, Lamont-Doherty Geological Observatory Industrial Associates, May, 1985.
8. Geophysical and Geochemical Data Acquisition -- in situ, Core Drilling for Ultradeep Scientific Targets: An Engineering Challenge, Engineering Foundation Conference, Dillard, Georgia, April, 1986.
9. Hydrogeological Processes at Mid-Ocean Ridges, Union Session, American Geophysical Union, Baltimore, 1986.
10. Well Logging, Cajon Pass Scientific Drill Hole, Tectonophysics, Special Session, American Geophysical Union, Baltimore, 1986.
11. Subduction Zone Water Budget, Kayko Conference, Tokyo, Japan, Nov. 1986.
12. New Techniques in logging of oil-field wells, Borehole Geophysics in Hydrology, U.S. Geological Survey, Water Resources Division, Reston, VA, 1987.
13. Geochemical Logging in the Oceanic Crust, Deutsche Geologische Gesellschaft, Hannover, 1987.
14. Geochemical Logging in the Ocean Drilling Program, American Geophysical Union, Union Session Speaker, 1987.
15. Conference Organizer, New Techniques in Geophysical and Geochemical Well Logging, Lamont-Doherty Geological Observatory, Industrial Associates Meeting, May, 1987.
16. Well logging in the Ocean Drilling Program, Technical Seminar on Research Boreholes, Society of Professional Well Log Analysts, Denver, 1989
17. Geochemical logging in the ODP, in Borehole Elemental Analysis Workshop, Society of Professional Well Log Analysts Lafayette, 1990
18. Dynamic Enhanced Recovery Technologies, Geophysics Luncheon, Society of Exploration Geophysicists, Houston, TX, Nov. 1991.
19. Workshop Organizer, Dynamic Exploitation Technologies, Society of Exploration Geophysicists, Oct. 1992.
20. 4-D Seismic Interpretation, Landmark Graphics International Users Conference, Keynote Speaker, Houston, Tx, Nov. 1993.
21. 4-D Seismic Interpretation Technologies,, Houston Geophysical Society, Jan, 1994.
22. The Pathfinder well, Symposium on Hydrocarbon Migration, American Association of Petroleum Geologists, Denver, 1994.
23. 4-D Mapping of Drainage in the Eugene Island 330 Field, Archie Conference, May, 1995.
24. The Future of Visualization, Archie Conference Workshop, May, 1995.
25. 4-D Reservoir Monitoring in Eugene Island, Offshore Technologies Conference Keynote Address, May, 1996.
26. 4-D Reservoir Monitoring--the Visualization Challenge, Am. Assoc. Petr. Geol. Annual Convention, invited paper, May, 1996.
27. 4-D Reservoir Monitoring--the Geophysical Challenge, Am. Assoc. Petr. Geol. Annual Convention, invited paper, May, 1996.
28. Successes and Pitfalls of 3-D Seismic, LSU Basins Research Center Conference, Houston, November, 1996.
29. AAPG Workshop in Reservoir Characterization, The Woodlands, Oct. 1996.
30. Petroleum Network Education Conference Short Course, 4-D Seismic Monitoring, Houston, June 15, 1997.
31. SMU Center for Earth and Man, November, 1997.
32. Baker Institute, Rice University, Energy technologies, November, 1998.
33. Silicon Graphics Visualization Summit, Galveston, Tx, 1999.
34. Silicon Graphics, Worldwide Visualization Summit, Oslo, Norway, 1999.
35. Rocky Mountain Geophysical Society, Denver, 1999.
36. Offshore Technology Conference, Keynote Speaker, 2000.
37. ThreatSim, a decision support simulator for urban infrastructure, at Con Edison, New York, November, 2002.

38. Future Natural Gas Supplies and the Ultra Deepwater Gulf of Mexico, (invited) Science Committee, U.S. House of Representatives, Feb. 26, 2003.
39. ThreatSim, a decision support simulator for Urban Infrastructure, at the Urban Utility Center, Polytechnic Institute of NYU, January, 2003.
40. The Future of the Electric Grid, Aspen Global Change Institute, July, 2003
41. Shocked by the Dark, Columbia University 250<sup>th</sup> Anniversary lecture series, Oct, 2003
42. The Distributed Storage-Generation “Smart” Electric Grid of the Future, The10-50 Solution: Technologies and Policies for a Low-Carbon Future, PEW Center for Global Climate Change and the National Energy Policy Council, PEW Foundation, March, 2004.
42. Nanotechnology and Energy: Electricity Transmission, Storage and the Grid, Baker Institute, Rice University, November 12-14, 2005.
43. New York Academy of Sciences, Energy System Research & Innovation: New York City Electricity - Past, Present, Future, February 21, 2006.
44. Written testimony, New York State Public Service Commission, Long Island City Blackout of summer, 2007.
45. Testified before Connecticut state legislature committee on energy and the environment, Feb. 2008.
46. New York City Smart Grid of the Future, PSERC, Arizona State University, Feb. 2008.
47. Popular Mechanics and the National Science Foundation present Bridges to the Future, a Webcast discussion exploring the best ideas for improving American Infrastructure, invited participant on Smart Grid panel, broadcast from NSF headquarters, April 10, 2008.
48. Green for the Green Environment Keynote, Con Edison Public Outreach Conference, NY, 2009
49. Smart Grid, Arizona State University, New Directions in Research, May, 2009
50. Arizona and the Smart Grid, Arizona State University, SkySong, 2011
51. Arizona Solar Summit, Glendale, 2011
52. Harvard Club, Hydraulic Fracturing, 2012
53. U.S. Italian Scientific Society, Rome, 2013
54. Machine Learning Conference, Finmeccanica, Rome, 2013
55. Di-BOSS, Green Buildings, NYC, 2014
56. Di-BOSS, CTBUH Tall Buildings of the World, NYC, 2015
57. IEEE Workshop on Big Data Analytics and the Internet of Things, 2017

#### **INVITED ENERGY PRESENTATIONS:**

Amoco, Tulsa, Oklahoma; Houston, Texas; New Orleans, Louisiana  
 Exxon, Houston, Texas  
 Arco, Plano, Houston, Texas  
 Phillips Petroleum, Bartlesville, Oklahoma  
 SOHIO, Dallas, Texas  
 Conoco, Ponca City, Oklahoma, Lafayette, Louisiana  
 Gulf, Pittsburgh, Pennsylvania  
 Halliburton, Duncan, Oklahoma  
 Schlumberger-Doll Research, Ridgefield, Connecticut  
 Schlumberger Well Services, Houston, Texas  
 Nippon Schlumberger, K.K., Tokyo, Japan  
 British Petroleum, London, England  
 Texaco, New Orleans, Louisiana  
 Premier Oil, London  
 Shell Oil, London, Houston, New Orleans  
 Royal Dutch Shell, Den Hague, Houston  
 AGIP, Milan, Italy  
 Chevron, Lafayette, New Orleans, Louisiana  
 IBM Thomas J. Watson Research Center, Yorktown Heights, New York

Pennzoil, Houston, Lafayette  
 BBN, Boston  
 Houston Geological Society  
 Tulsa Geological Society  
 Ft. Worth Geological Society  
 USGS, Coastal Studies Center, St. Petersburg, Fla.  
 Energy Research Clearing House, The Woodlands, Tx  
 Statoil, Trondheim, Norway  
 Norsk Hydro, Bergen, Norway  
 Dodge and Cox, San Francisco  
 Western Geophysical, Europe, Africa, Middle East  
 Offshore Technologies Conference  
 Lean Energy Management, BP America Corporate Headquarters, NYC  
 Edison Program, Technology Seminar, Learning Center, Con Edison  
 First Energy, Akron Ohio, Computer-Aided Lean Management  
 Office of Emergency Management, NYC  
 CenterPoint, Houston, TX  
 Oncor, Dallas, TX  
 Arizona State University

#### **4D RESERVOIR MONITORING SHORT COURSES:**

- Shell Wood Creek, July, 1996
- Western Geophysical, Rome and Cairo, Sept, 1996
- Texaco E&P New Orleans, Nov, 1996
- Prudential Securities, Dec, 1996
- Norsk Hydro, May, 1997
- Shell Aberdeen, June, 1997
- Western Geophysical, London, Aug. 1997
- 4-D Workshop, Crouse Technical Services, Dallas, 1998
- 4-D Workshop, Energy Logistics and Oil and Gas Journal, Aberdeen, 1998.

#### **OCEAN DRILLING PROGRAM LOGGING SCHOOLS:**

- Ocean Research Institute, Tokyo, Japan, Nov. 1985.
- Institute of Ocean Sciences, Cambridge, England, Jan. 1987.
- Institute Francais for Research in the Oceans, Paris, France, Jan. 1987.
- Bundesanstalt fur Geowissenschaften und Rohstoffe, Hannover, Germany, 1987.
- Information Handling Panel, Ocean Drilling Program, New York, Aug. 1987.
- Deutsch Geological Society Annual Meeting, Hannover, Oct. 1987.
- Geological Society of America, Nov. 1988
- American Geophysical Union, San Francisco, Dec. 1988.
- Canadian Geological Association, Montreal, May, 1989
- International Union of Geology, Washington, D.C., July, 1989
- National Environmental Research Council, London, September, 1989
- Ocean Drilling Program, Texas A&M, Jan., 1990
- American Association of Petroleum Geologists, June, 1990
- Australian Geological Society, Brisbane, October, 1990

#### **COMMUNITY SERVICE:**

West Side Little League, Head of Umpires, Manhattan, NY  
 Houston Museum of Natural Sciences, Wiess Energy Hall, Design Committee

American Association of Petroleum Geologists, Distinguished Lecturer  
Scholastic Magazine, Advisory Board, Super Science for Kids  
National Science Foundation, High School Science Honors Program, Columbia University  
Office of Naval Research, National Advisory Committee, Deep Sea Diving Submersible ALVIN  
Ocean Drilling Program, Executive and Planning Committees  
Science Lecturer, Bronx High School of Science, NY

**PROFESSIONAL ORGANIZATIONS:**

IEEE, Computer Sciences  
American Geophysical Union  
American Association of Petroleum Geologists  
Society of Exploration Geophysicists  
Society of Petroleum Engineers  
Society of Professional Well Log Analysts