

ALBERT G. BOULANGER

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Pioneer in far-reaching energy R&D involving intelligent systems and machine learning in electrical power, renewable energy, smart buildings, smart grids, smart cities, and healthcare for over 20 years.

EDUCATION

B.S. Physics, University of Florida
M.S. Computer Science, University of Illinois

EXPERTISE

Skills: data science, machine learning, pattern recognition, forecasting, time series analysis, causal inference, geostatistics, exploratory data analysis, data mining, algorithms, data analysis, computer science, artificial intelligence, program management, programming, software engineering, mathematical modeling, simulations, high performance computing, software development, statistics, knowledge engineering, modeling, system architecture, research, R&D, project management, strategic planning, SQL, Lisp, Python, R, databases, strategic thinking, leadership, management, coherent optical processing, lasers, holography, sustainability, energy, power grids, smart grids, microgrids, smart cities, smart buildings and cleantech.

Special skills: Systems integration, expert and knowledge-based systems, machine learning including the interface between numerical and symbolic algorithms, parallel computing, pattern recognition applied to 4D seismic data, computer representations of complex scientific and engineering objects, visualization, distributed systems, and interoperability. Specialties are complex systems integration and intelligent computational reasoning that interacts with humans within large-scale systems

EXPERIENCE

**2019-Present Department of Neurology, Columbia University Medical Center
Columbia University New York, New York
Senior Data Architect**

Employed as Senior Data Architect with the Department of Neurology at CUMC Columbia University. Involved in data engineering for the Thompson Project, a large scale initiative to use multiple datasets to move the needle on neurodegenerative diseases, specifically Alzheimer's.

**2005-Present World Team Now, Malibu California.
VP & Director of Technical Strategy (nonprofit, volunteer)**

Serves as a board member, VP, and Director of Technical Strategy of the nonprofit environmental and social organization, World Team Now and a partner in a related company, World Team-Building, LLC. Advise, leveraging 30+ years of expertise in science, technology, and energy, on big-picture technical matters and technical implementation decisions.

**2019-2019 Mediphore Inc
New York, New York
Senior Developer**

Virtualized the company's application and deployed it on development and production servers and documented steps. Installed a Gitlab repository and Docker.

**2005-2017 Center for Computational Learning Systems,
Columbia University New York, New York
Senior Staff Associate**

Employed as Senior Staff Associate with the Center for Computational Learning Systems (CCLS) of Columbia University. Involved in far-reaching energy research and development involving intelligent systems in electrical power, renewable energy, smart buildings, smart grids, and smart cities. Involved in over 15+ industry-sponsored R&D projects resulting in a startup, CALM Energy, and licensing of patents.

Acted as Director of the Smart-X {Cites, Buildings, & Grids} group at CCLS. Recent projects included a reinforcement learning based microgrid controller for Africa villages, and optimal placement of inductive charging stations for electric buses. For Con Edison, recent projects included image processing using deep learning of thermal images to look for trouble in manholes and using causal inference and machine learning to produce a cost vs. benefit study of reliability improvement programs. As part of a partnership with the Rudin Management Company and Selex ES, the Smart-X group developed the machine learning based forecasting and recommendation capability for a commercial product, the Di-BOSS Smart Building Solution.

**1994-2005 Lamont-Doherty Earth Observatory,
Columbia University, Palisades New York.
Senior Staff Associate, 4-D Group**

Worked as Senior Staff Associate in the 4-D Group at the Lamont-Doherty Earth Observatory of Columbia University. Focused on new business development within Roger Anderson's group at Lamont. Also worked on introducing machine learning concepts in asset management of power grids and oil and gas.

Involved in a variety of computer science initiatives within industry consortia, including visualization, system integration, advanced computation, databases, and interoperability. Visualized portfolio management data and results for the industry-sponsored portfolio management consortium. Worked on pattern recognition methods for identifying and tracking changes in oil and gas reservoirs by making use of multiple seismic surveys shot over time. The culmination was the formation of vPatch Inc., which commercialized groundbreaking technology the team developed and prior to that, the licensing the IP to 4D Technology Inc. and Baker Hughes.

2000-2002 CTO, vPatch Technologies Inc., Houston Texas.

Served as CTO for vPatch Technologies, Inc. during a leave of absence from Columbia. vPatch's business focus was to implement wired processes that connect business decision-making and hydrocarbon reservoirs in real time to enable the use of portfolio management, real-options, EVA and other modern techniques to plan and execute enterprise optimization.

1992-1994 BBN Laboratories Division, BBN Systems and Technologies Corporation, Cambridge, Massachusetts Scientist Applied Physics Department.

Readied the acoustic modeling system PRISM, implemented in Lisp, for beta test. The goal of PRISM was to support engineering acoustics design. Also led the design and integration of image management and manipulation functions for an Army project called MIDAS. MIDAS integrated database technology with image analysis and acoustic modeling functions.

1982-1992 BBN Laboratories Division, BBN Systems and Technologies Corporation, Cambridge, Massachusetts Scientist, Intelligent Systems Department

Worked on several intelligent systems, expert systems, and machine learning applications and frameworks: the Steamer intelligent tutoring system; DesigNet, an intelligent CAD tool for designing packet switching networks and a tool for automated network management; the FLEX rule base system framework and applications of it including a human factors simulation of radar operators, a wind shear adviser for pilots, and an expert system for audit selection for the IRS; teaching AI to clients; AI tools for parallel processors; a parallel rule base system for a manufacturing-process simulation/diagnostic demonstration; a machine learning framework called Beginner under internal funding; and the application of Beginner to relating biological indicators of rivers to their health

Within the Speech Department, investigated methods using unsupervised clustering to automate the analysis of recorded conversations of ground-control to plane conversations and was the systems integrator and implemented the GUI for the resulting demonstration system called Gister.

Previous work experience

Previous work experience included 6 years of part-time work in high school and college at the National Hurricane and Experimental Meteorology Laboratory, Coral Gables, Florida. Was a co-principle investigator on a study of the effect of cloud seeding on lightning.

HONORS

Member of the winning team of a GE Ecomagination Challenge Innovation Prize in 2010 to apply machine learning to optimize electric delivery truck charging schedules:
<http://engineering.columbia.edu/smart-grid-project-wins-ge-grant>.

American Association of Artificial Intelligence certificate of recognition for the conference paper:
P. Gross, A. Boulanger, M. Arias, D. Waltz, P. Long, C. Lawson, R. Anderson, M. Koenig, M. Mastrocinque, W. Fairechio, J. Johnson, S. Lee, F. Doherty, and A. Kressner, "Predicting electricity distribution feeder failures using machine learning susceptibility analysis," in *Proceedings of the 21st National Conference on Artificial Intelligence - Volume 1*, 2006, pp. 1705–1711.

Three Special Achievement Awards from the National Hurricane and Experimental Meteorology Laboratory for accomplishments in programming and work on lightning.

Co-winner of the Max A. Eaton prize for the best student paper at the 11th Technical Conference on Hurricanes and Tropical Meteorology.

ENTREPRENEURIAL

Co-founder and CTO of vPatch Inc to commercialize 4D seismic reservoir modeling software.
<http://tiger.aboulanger.com/web/vpatch/>

Co-founder and partner of CES Enterprise LLC. Incubator for advanced business/technology solutions for the Oil and Gas Industry <http://ces-enterprise.com/>

Co-founder CALM Energy Inc. startup from Columbia University Ventures.
<http://www.calmenergyinc.com/>

Co-founder and partner of World Team- Building, LLC to conduct the for-profit aspects of the World Team project <http://worldteamnow.org/blog/wtn-ev/>

BOOKS

- Computer-Aided Lean Management for the Energy Industry, Roger N. Anderson, Albert Boulanger, John A. Johnson, Arthur Kressner, PennWell Books, 2008

PUBLICATIONS

1. "Using an Ancillary Neural Network to Capture Weekends and Holidays in an Adjoint Neural Network Architecture for Intelligent Building Management," Z. Ding, M. K. Turkcan, and A. Boulanger, arXiv Prepr arXiv190206778. December 2018.
2. "An Innovative Approach to Vehicle Electrification for Smart Cities," Promiti Dutta, Albert Boulanger, Roger Anderson and Leon Wu. Handbook of Research on Social, Economic, and Environmental Sustainability in the Development of Smart Cities. IGI Global, 2015. 193-212.
3. "Di-BOSS: Research, Development & Deployment of the World's First Digital Building Operating System," Roger Anderson, Albert Boulanger, Vaibhav Bhandari, Jessica Forde, Ashish Gagneja, Arthur Kressner, Ashwath Rajan, Vivek Rathod, Doug Riecken, David Solomon, Leon Wu, John Gilbert, Eugene Boniberger, Mattia Cavanna, Willem Neiuwkerk, Bruce Sher, Nate Maloney in Automated Diagnostics and Analytics for Buildings, Fairmont Press, 9/2014
4. "Game theoretic approach to offering participation incentives for electric vehicle-to-vehicle charge sharing," Promiti Dutta, Albert Boulanger, Transportation Electrification Conference and Expo (ITEC), 2014 IEEE, vol., no., pp.1,5, 15-18 June 2014
5. "Cost-optimal, robust charging of electrically-fueled commercial vehicle fleets via machine learning," Systems Conference (SysCon), Jigar Shah, Matthew Nielsen, Andrew Reid, Conner Shane, Kirk Mathews, David Doerge, Richard Piel, Roger Anderson, Albert Boulanger, Leon Wu, Vaibhav Bhandari, Ashish Gagneja, Arthur Kressner, Xiaohu Li, and Somnath Sarkar, 2014 8th Annual IEEE , vol., no., pp.65,71, March 31 2014-April 3 2014
6. "A Robust Solution to the Load Curtailment Problem," Hugo P. Simão, Hyun Bin Jeong, Boris Defourny, Warren B. Powell, Albert Boulanger, Ashish Gagneja, Leon Wu, Roger N. Anderson, IEEE Transactions on Smart Grid, vol.4, no.4, pp.2209,2219, Dec. 2013
7. "Di-BOSS™: Digital Building Operating System Solution," Jessica Forde, Vivek Rathod, Hooshmand Shookri, Vaibhav Bandari, Ashwath Rajan, John Min, Ariel Fan, Leon Wu, Ashish Gagneja, Doug Riecken, David Solomon, Lauren Hannah, Albert Boulanger, Roger Anderson," 2013 Conference on Neural Information Processing Systems (NIPS 2013), Demonstration 12/6/2013

8. "Improving efficiency and reliability of building systems using machine learning and automated online evaluation," Leon Wu, Gail Kaiser, David Solomon, Rebecca Winter, Albert Boulanger, Roger Anderson, Systems, Applications and Technology Conference (LISAT), 2012 IEEE Long Island, vol., no., pp.1,6, 4-4 May 2012
9. "Machine Learning for the New York City Power Grid," Cynthia Rudin, David Waltz, Roger Anderson, Albert Boulanger, Ansaif Salieb-Aouissi, Maggie Chow, Haimonti Dutta, Philip Gross, Bert Huang, and Steve Jerome, Transactions on Pattern Analysis and Machine Intelligence Volume 34 Issue 2, February 2012
10. "Failure Analysis of the New York City Power Grid," Leon Wu, Roger N Anderson, Albert G Boulanger, Cynthia Rudin, Gail E Kaiser, CU CS Technical Report CUCS-025-14, 2012
11. "Using Support Vector Machine to Forecast Energy Usage of a Manhattan Skyscraper," Rebecca Winter, Albert Boulanger, Roger Anderson, Leon Wu, AGU Fall Meeting Abstracts 1, 0984, 2011
12. "Vehicle Electrification: Status and Issues," Albert Boulanger, Andy Chu, Suzanne Maxx, and David Waltz, Proceedings of the IEEE, vol.99, no.6, pp.1116-1138, June 2011
13. "Adaptive Stochastic Control for the Smart Grid," Roger Anderson, Albert Boulanger, Warren Powell, and Warren Scott, Proceedings of the IEEE, vol.99, no.6, pp.1098-1115, June 2011
14. "Estimation of System Reliability Using a Semiparametric Model," Leon Wu, Timothy Teravainen, Gail Kaiser, Roger Anderson, Albert Boulanger, and Cynthia Rudin, Proceedings of IEEE EnergyTech, 2011.
15. "Evaluating Machine Learning for Improving Power Grid Reliability," Leon Wu, Gail Kaiser, Cynthia Rudin, David Waltz, Roger Anderson, Albert Boulanger, Ansaif Salieb-Aouissi, Haimonti Dutta, and Manoj Poolery, Proceedings of the ICML 2011 workshop on Machine Learning for Global Challenges, International Conference on Machine Learning, 2011.
16. "Seizure Detection from Multiple Frequency Bands of Intra-cranial EEG using High Dimensional Clustering," Haimonti Dutta, David Waltz, Karthik M Ramasamy, Phil Gross, Ansaif Salieb-Aouissi, Hatim Diab, Manoj Pooleery, Albert Boulanger, Catherine Schevon and Ronald Emerson, Poster at the Fourth International Workshop on Seizure Prediction ISPW4, Kansas City, MO, June 2009.
17. "Estimating the Time Between Failures of Electrical Feeders in the New York Power Grid," Haimonti Dutta, David Waltz, Alessandro Moschitti, Daniele Pighin, Philip Gross, Claire Monteleoni, Ansaif Salieb-Aouissi, Albert Boulanger, Manoj Pooleery and Roger Anderson, Next Generation Data Mining Summit, NGDM 2009, Columbia MD.
18. "Ranking Electrical Feeders on the New York Power Grid," Phil Gross, Ansaif Salieb-Aouissi, Haimonti Dutta and Albert Boulanger, ICMLA, 2009, Miami, FL.
19. "Ranking Electrical Feeders of the New York Power Grid," Phil Gross, Ansaif Salieb-Aouissi, Haimonti Dutta and Albert Boulanger, 3rd Annual Machine Learning Symposium at the New York Academy of Sciences (NYAS), New York, October, 2008 (Poster)
20. "LEAN ENERGY MANAGEMENT-12: Gas-to-electricity real options can provide deepwater strategic, operational flexibility," Roger Anderson, Albert Boulanger & John Johnson, Oil&Gas Journal July 23, 2007
21. "Getting Lean and Efficient," Roger Anderson, Albert Boulanger, John Johnson, & Arthur Kressner, EnergyBiz Magazine, July/August 2006
22. "Predicting Electricity Distribution Feeder Failures Using Machine Learning Susceptibility Analysis," Philip Gross, Albert Boulanger, Marta Arias, David Waltz, Philip M. Long, Charles Lawson, Roger Anderson, Matthew Koenig, Mark Mastrocinque, William Fairechio, John A. Johnson, Serena Lee, Frank Doherty, Arthur Kressner, Eighteenth Innovative Applications of Artificial Intelligence Conference Boston, Massachusetts July 18-20 2006

23. "LEAN ENERGY MANAGEMENT-11: Martingale Control of 4-D Seismic Reservoir Management," Roger Anderson and Albert Boulanger, Wei He, Ulisses Mello and Liqing Xu, Oil&Gas Journal May 15, 2006
24. "LEAN ENERGY MANAGEMENT-10: How Martingale stochastic control navigates computer-aided lean energy management," Anderson, R., A. Boulanger, Oil&Gas Journal September 19, 2005
25. "LEAN ENERGY MANAGEMENT-9: Boosting, support vector machines and reinforcement learning in computer-aided lean management," Roger Anderson, Albert Boulanger, Philip Gross, Philip M. Long, David Waltz, Oil&Gas Journal May 9, 2005
26. "LEAN ENERGY MANAGEMENT-8: Use of matrices in computer-aided lean energy management," Anderson, R., A. Boulanger, Oil&Gas Journal March 7, 2005
27. "LEAN ENERGY MANAGEMENT-7: Knowledge management and computational learning for lean energy management," Anderson, R., A. Boulanger, Oil&Gas Journal November 22, 2004
28. "LEAN ENERGY MANAGEMENT-6: Ultradeep offshore suitability matrix for estimating value of Lean Processes," Anderson, R., A. Boulanger, Oil&Gas Journal June 28, 2004
29. "LEAN ENERGY MANAGEMENT-5: Enterprise-wide systems integration needed in ultradeepwater operations," Anderson, R., A. Boulanger, Oil&Gas Journal November 24, 2003
30. "LEAN ENERGY MANAGEMENT-4: Flexible manufacturing techniques make ultradeepwater attractive to independents," Anderson, R., A. Boulanger, Oil&Gas Journal August 25, 2003
31. "LEAN ENERGY MANAGEMENT-3: How to realize LEM benefits in ultradeepwater oil and gas," Anderson, R., A. Boulanger, Oil&Gas Journal June 30, 2003
32. "LEAN ENERGY MANAGEMENT-2: Ultradeepwater oil-gas development: Designing uncertainty into the enterprise," Anderson, R., A. Boulanger, Oil&Gas Journal May 19, 2003
33. "LEAN ENERGY MANAGEMENT-1: Lean energy management required for economic ultradeepwater development," Anderson, R., A. Boulanger, J. Longbottom, R. Oligney, Oil&Gas Journal March 17, 2003
34. "Future Natural Gas Supplies and the Ultra Deepwater Gulf of Mexico," Anderson, R., A. Boulanger, J. Longbottom, R. Oligney, Energy Pulse, March, 2003, online at: http://www.energypulse.net/centers/article/article_display.cfm?a_id=232
35. "ThreatSim: Securing Wattage When Needed," Anderson, R., A. Boulanger, Energy Pulse, Oct 14, 2002, online at: http://www.energypulse.net/centers/article/article_display.cfm?a_id=232
36. "Visualization of Oil, Gas, and Water in the Subsurface," Roger Anderson and Albert Boulanger, OTC #13006, Offshore Technology Conference, May 2001
37. "4D Reservoir Monitoring leads to Web-enabled Oil Field," Roger Anderson, Albert Boulanger, et.al., American Oil & Gas Reporter, July 2000
38. "The Economics of 4D Reservoir Management," Roger Anderson, Albert Boulanger, John I Howell III, OTC #12129, Offshore Technology Conference, May 2000
39. "Quantitative Tools Link Portfolio with Technology," Roger Anderson and Albert Boulanger, Oil & Gas Journal, November 30, 1998
40. "4-D Enabling Command-and-Control," Roger Anderson & Albert Boulanger, American Oil & Gas Reporter, July 1998
41. "4D Time-Lapse Seismic Monitoring in the South Timbalier 295 Field, Gulf of Mexico," Roger Anderson, Albert Boulanger, Wei He, Liqing Xu, Peter Flemmings, Tucker Burkhardt, and Andrew Hoover. Offshore Technology Conference, Houston TX, May 1997
42. "4-D Seismic: The fourth dimension in reservoir management. Part 6: 4D Seismic Reservoir Simulation". Teng, Y-C; Anderson, R. N.; Boulanger, A.; He, W.; Xu, L.; Guerin, G.; Mello, U. T.; Neal, R. and Meadow, W., 1997, World Oil, Oct 97, pp. 113-121
43. "4-D Seismic: The fourth dimension in reservoir management. Part 5: Reservoir Simulation as Tool to Validate and Constrain 4-D Seismic Analysis". Guerin, G.; Mello, U. T.; He, W.; Anderson,

- R. N.; Boulanger, A.; Teng, Y-C; Xu, L.; Neal, R. and Meadow, W. - 1997, World Oil, Sep 97, pp. 75-79.
44. "4-D Seismic: The Fourth Dimension in Reservoir Management. Part 4: Inversion Of 4-d Seismic Changes To Find Bypassed Pay," He, W.; Anderson, R.n. ; Boulanger, A.; Teng, Y.c.; Xu, L.; Neal, R.; Meadow, B., World Oil; VOL. 218; ISSUE: 7; PBD: Jul 1997
 45. "4-D Seismic: The Fourth Dimension in Reservoir Management. Part 3: 4-d Reservoir Monitoring, The Business Driver," Authors: Xu, L.; Anderson, R.n. ; Boulanger, A.; Teng, Y.c.; He, W.; Neal, R.; Meadow, B., World Oil; VOL. 218; ISSUE: 6; PBD: Jun 1997
 46. "4-D Seismic: The Fourth Dimension in Reservoir Management Part 2: Why 4-D Now? The information technology revolution has changed the way we do business," Roger Anderson, Albert Boulanger, Wei He, Yu-Chiung Teng, Billy Meadow, and Randall Neal, World Oil 218, no. 3, April 1977, pp. 43-46, 48
 47. "4-D Seismic: The Fourth Dimension in Reservoir Management Part 1: What is 4-D and how does it improve recovery efficiency?," Roger Anderson, Albert Boulanger, Wei He, Yu-Chiung Teng, Billy Meadow, and Randall Neal, World Oil, March 1977
 48. "4D Seismic Monitoring of Reservoir Production," Roger Anderson, Albert Boulanger, Wei He, and Liqing Xu, 3D Atlas, SEG/AAPG Memoir, September, 1996
 49. "How 4D Seismic Monitoring Works," Liqing Xu, Roger N. Anderson, Albert Boulanger, and Wei He, AAPG Explorer, October 1996
 50. "Seismic Advances Moving In from 'Far-Field' Industries," Albert Boulanger, Roger Anderson, and Jim Barger, American Oil & Gas Reporter, July 1996
 51. "Visualization of Hydrocarbon Drainage Using 4-D Seismic Techniques," R.N. Anderson, A. Boulanger, W. He, Session - AAPG 5/21 1996: 3-D/4-D Modeling and Visualization in Exploration and Development - Best of Archie Conference, 1995
 52. "4-D Seismic Monitoring Technologies and Their Applications to the Eugene Island 330 field of Offshore Louisiana," R.N. Anderson, A. Boulanger, W. He, L. Xu, Session - AAPG 5/22 1996: Development Geophysics: Seismic Stratigraphic Analysis of Reservoirs, Case Studies of AVO Analysis, 4-D Seismic
 53. "Production Operations Move to 5-D," Roger Anderson, Albert Boulanger, Wei He, and Liqing Xu, American Oil and Gas Reporter, February 1996.
 54. "4D Seismic Helps Track Drainage, Pressure Compartmentalization, Gulf of Mexico Management -- 1," Roger N. Anderson, Albert Boulanger, Wei He, Y.F. Sun, David Sibley, John Austin, Richard Woodhams, Liqing Xu, Richard Andre, and Kent Reinhart), Oil & Gas Journal, 93, no. 13, March 27, 1995
 55. "Method Described for Using 4D Seismic to Track Reservoir Fluid Movement, Gulf of Mexico Management -- 2," Roger N. Anderson, Albert Boulanger, Wei He, Y.F. Sun, David Sibley, John Austin, Richard Woodhams, Liqing Xu, Richard Andre, and Kent Reinhart), Oil & Gas Journal, 93, no. 14, April 3, 1995
 56. "4-D Seismic Imaging of the Drainage and Migration Pathways in Eugene Island 330/338" (with Roger N. Anderson, Wei He, Y.F. Sun, and Liqing Xu), in GBRN CD-ROM, Lamont Press, 1995.
 57. "Gisting Conversational Speech", R. Rohlicek, D. Ayuso, M. Bates, A. Boulanger, P. Jeanrenaud, M. Meteer and M. Siu, Proc. International Conference on Acoustics, Speech and Signal Processing, volume 2, pages 113-116, 1992.
 58. "Loosely Coupled Environmental Models" Albert Boulanger & Julio Escobar, ESSIS Conference on Earth and Space Science Information Systems, Pasadena, CA, February 10-13, 1992.
 59. "Simulated Annealing" in Encyclopedia of Artificial Intelligence, 2nd Edition, Stuart Shapiro (Ed. in Chief), John-Wiley, 1992.

60. "Using Machine Learning Techniques to Visualize and Refine Criteria for Biological Integrity" Kenneth Anderson, Albert Boulanger, Lawrence Davis, Herbert Gish, James Kelly, & Jeffrey Morrill, Proceedings of Biological Criteria: Research and Regulation Symposium, US EPA, Office of Water, Washington DC, July 1991, 123-128.
61. "Advanced Mathematics from an Elementary Viewpoint: Chaos, Fractal Geometry, and Nonlinear Systems" Wallace Feurzeig, Paul Horwitz & Albert Boulanger, Computers and Mathematics, E. Kaltfen and S.M. Watts Eds., Springer-Verlag, 1989, pp. 240-249.
62. "The Modification of a Rule-Based Diagnostic System for Routinized Parallelism on the Butterfly Parallel Processor," Proceedings of the Third International Conference on Supercomputing, May 1988, Volume II, pp. 146-156.
63. "The Modification of a Rule-Based Diagnostic System for Routinized Parallelism on the Butterfly Parallel Processor," BBN Report #6713, February 1988.
64. "Parallelism in the Execution of a Routine Knowledge Rule System on the Butterfly Computer," BBN Report #6436, December 1986.
65. "Butterfly Expert Systems Execution Environment: A Functional Specification. Version 1.0" (with others), BBN Report #6225, August 1986.
66. "The Technology of Expert Systems" Robert Michaelsen & Albert Boulanger, BYTE Magazine, April 1985, pp. 303-312.
67. "The Expert System PLANT/cd: A Case Study in Applying the General Purpose Inference System Advise to Predicting Black Cutworm Damage in Corn," Departmental Report, Department of Computer Science, University of Illinois UIUCDCS-R-83-1134, July 1983.
68. "An initial Assessment of Flash Density and Peak Current Characteristics of Lightning Flashes to Ground in South Florida," (with R.I. Sax and M.W. Maier), Contract Report, NUREG/CR-1024, October 1979.
69. "Cloud-to-Ground Lightning Frequency Over South Florida," Michael W. Maier, Albert G. Boulanger, and J. Sarlet, Preprint Volume, Conference on Cloud Physics and Atmospheric Electricity, Issaquah, Washington, July 31-August 4, 1978, pp. 605-610
70. "On the frequency of cloud-to-ground lightning from tropical cumulonimbus clouds.," Albert G. Boulanger, & Michael W. Maier, Proceedings, 11th Technical Conference on Hurricanes and Tropical Meteorology, December 13-16, Miami Beach, Florida, American Meteorological Society, Boston, 1977, pp. 450-454.
71. "A Comparison of Dynamic Seedability Prediction with Two Cloud Models During FACE-73," William R. Cotton & Albert Boulanger, NOAA Technical Memo ERL WPMO-22, June, 1975.
72. "On the Variability of 'Dynamic Seedability' as a Function of Time and Location Over South Florida: Part I, Spatial Variability," William R. Cotton & Albert Boulanger, Journal of Applied Meteorology, 1975, V14, N5, pp. 710-717.
73. "On the Variability of 'Dynamic Seedability' as a Function of Time and Location Over South Florida: Part II, Temporal Variability," William R. Cotton & Albert Boulanger, Journal of Applied Meteorology, 1975, V14, N7, pp. 1376-1382.
74. "On the Variability of 'Dynamic Seedability' as a Function of Time and Location Over South Florida," William R. Cotton & Albert Boulanger, Preprint Volume, Fourth Conference on Weather Modification, Ft. Lauderdale, Florida, November 18-21, 1974.

PATENTS & PATENT APPLICATIONS

1. "Total Property Optimization System for Energy Efficiency and Smart Buildings," Roger N Anderson, Albert Boulanger, Vaibhav Bhandari, Eugene Boniberger, Ashish Gagneja, John Gilbert, Arthur Kressner, Ashwath Rajan, David Solomon, Jessica Forde, Leon L Wu, Vivek Rathod, Kevin Morenski, Hooshmand Shokri, U.S. Patent Application 20150178865 6/25/2015
2. "Forecasting system using machine learning and ensemble methods." Roger N. Anderson, Albert Boulanger, Leon L. Wu, Viabhav Bhandari, Somnath Sarkar, and Ashish Gagneja. U.S. Patent Application 14/707,809, filed May 8, 2015.
3. "Decision Support Control Centers", Roger N. Anderson, Albert Boulanger, Philip Gross, Robert J. Blick, Leon Bukhman, Mark Mastrocinque, John Johnson, Fred Seibel, Hubert Delany, U.S. Patent 8,972,066 3/3/2015
4. "Machine Learning for Power Grid," Roger N. Anderson, Albert Boulanger, Cynthia Rudin, David Waltz, Ansa Saleb-Aouissi, Maggie Chow, Haimonti Dutta et al, U.S. Patent 8,751,421 6/10/2014.
5. "Adaptive Stochastic Controller for Dynamic Treatment of Cyber-Physical Systems, Roger N Anderson, Albert Boulanger, Leon L Wu, Kevin McInerney, Timothy Teravainen, Bibhas Chakraborty," U.S. Patent Application 2014015603, 6/5/2014
6. "Capital Asset Planning System," Roger N Anderson, Maggie Chow, Albert Boulanger, U.S. Patent 8,725,625, 5/13/2014
7. "Metrics Monitoring and Financial Validation System (M2FVS) for Tracking Performance of Capital, Operations, and Maintenance Investments to an Infrastructure," Roger N Anderson, Albert Boulanger, Leon Wu, Serena Lee, U.S. Patent 8,725,665, 5/13/2014
8. "Adaptive Stochastic Controller for Energy Efficiency and Smart Buildings," Leon L. Wu, Albert Boulanger, Roger N. Anderson, Eugene M. Boniberger, Arthur A. Kressner, John J. Gilbert, U.S. Patent App. 14/203,151, 3/10/2014
9. "Contingency Analysis Information for Utility Service Network," Maggie Chow, Mark Mastrocinque, Robert J. Blick, Roger N. Anderson, Albert Boulanger, Philip Gross, U.S. Patent 8,583,405, 11/12/2013
10. "Martingale control of production for optimal profitability of oil and gas fields," Roger Anderson, Albert Boulanger, Wei He, Ulisses Mello, Liqing Xu, U.S. Patent 8,560,476, 10/15/2013
11. "Metrics and Semiparametric Model Estimating Failure Rate and Mean Time between Failures," Timothy Teravainen, Leon L. Wu, Roger N. Anderson, Albert Boulanger, PCT Pat Application PCT/US12/033309, 10/19/2012
12. "Adaptive Stochastic Controller for Distributed Electrical Energy Storage Management", Roger N. Anderson, Albert Boulanger, and Arthur A. Kressner, U.S. Patent App. 13/589,916, 8/20/2012
13. "Systems and Methods for Martingale Boosting in Machine Learning," Roger N. Anderson, Albert Boulanger, Philip M. Long, Rocco A. Servedio, U.S. Patent 8,036,996, 10/11/2011
14. "Dynamic Contingency Avoidance and Mitigation System," Roger N. Anderson, Albert Boulanger, and John A. Johnson, PCT Pat Application 13/214057, August 19, 2011
15. "System and Method for Grading Electricity Distribution Network Feeder Conditions," David Waltz, Roger N. Anderson, Albert Boulanger, Marta Arias, Phillip Gross, Phil Long, U.S. Patent 7,945,524, 5/17/2011
16. "Methods and Systems of Determining the Effectiveness of Capital Improvement Projects", Roger N. Anderson, Albert Boulanger, Samantha Cook, John Johnson, PCT Application, PCT/US09/037996, 3/23/2009
17. "Innervated Stochastic Controller for Real Time Business Decision-Making Support," Roger N. Anderson, Albert Boulanger, United States Patent 7,39,5252, 7/1/2008

18. "Petroleum Reservoir Simulation Characterization System and Method", Roger N. Anderson, Albert Boulanger, Wei He, Jody Winston, Liqing Xu, Ulisses Mello, Wendell Wiggins, U.S. Patent 6,826,483, 11/30/2004
19. "Method for Identifying Subsurface Fluid Migration and Drainage Pathways in and among Oil and Gas Reservoirs Using 3-D and 4-D Seismic Imaging," Roger Anderson, Edward Bagdonas, Albert Boulanger, Wei He, Liqing Xu, U.S. Patent 5,586,082, 12/17 1996