

## Gerald B. Sheblé, PhD, MBA

### Vita

Revised June 2016

**I seek to integrate engineering design and analysis with sound financial and economic valuations to provide the right infrastructure at the right price for a sustainable society.**

#### I. PERSONAL DATA

Name	Gerald B. Sheblé
Home Address	Available on request
Phone:	(971) 258-5936
Email:	gbsepmt@gmail.com
Citizenship	USA

#### II. EDUCATION

MBA	(Economics, Finance)	University of Iowa	2001
Ph.D.	EE (Operations Research)	Virginia Tech.	1985
Dissertation: "Unit Commitment for Operations"			
M.S.E.E.		Purdue University	1974
Project Report: "AC Load Flow Studies with DC Transmission Links"			
B.S.	EE	Purdue University	1971
Senior Project: "Design and Construction of a 500kV impulse generator"			

#### III. ACADEMIC EXPERIENCE

6-12 – 6-13	AUSGRID Chair Electric Power Economics, UNSW EE&T
9-10 – 1-12	Graduate Faculty University of Arkansas, Little Rock, Arkansas
4-08 – 1-10	Senior Researcher INstituto de Engenharia de Sistemas e Computadores do Porto (Institute for Systems and Computer Engineering in Porto - INESC)
3-08 – present	Professor Catedrático Convidado, University of Porto, Portugal (FEUP) Honorary Professorship, taught courses and research in conjunction with MIT Portugal Sustainable Energy Systems Doctoral Program.

1-06 – 5-09	Maseeh Professor of Electrical & Computer Engineering, Department of Electrical & Computer Engineering Portland State University, Portland, OR 8-90 – 12-05 Member Graduate Faculty, ISU
9-04 – 12-05	Chair, Electric Power & Energy Systems, ISU
5-00 – 7-02	Chair, Electric Power & Energy Systems, ISU
9-99 – 7-01	Director of Complex Adaptive Systems Program, ISU
8-95 – 12-05	Professor
	Department of Electrical & Computer Engineering Iowa State University, Ames, IA
8-90 – 7-95	Associate Professor (August 21, 1990)
	Department of Electrical Engineering & Computer Engineering Iowa State University, Ames, IA
9-86 – 8-90	Associate Professor
	Electrical Engineering Department Auburn University, Auburn, AL 36849-5201
1978	Instructor and advisory Virginia Tech.
1973 – 1974	Graduate Research Assistant, Purdue University, Dr Gerald T. Heydt, HVDC Link Modeling

#### IV. INDUSTRIAL AND OTHER NON-ACADEMIC EXPERIENCE

2003 – Present: Associate Editor, IEEE Power & Energy Magazine, **Associate Editor**, *Business Scene*. **Dr. Sheblé** is responsible for articles related directly to the Business Scene, In My View, and special issue overviews. Invited articles listed in the following, including book reviews.

2014 – Present: MAXISYS, Principal Consultant. **Dr. Sheblé** support development work at Bonneville Power Administration, primarily in State Estimation. He also contributes to proposal writing, new venture seeking, and software development for MAXISYS's products.

1986 – Present: epmt, Inc. Consultant. **Dr. Sheblé** has served as consultant to companies after leaving the industrial sector to become a professor at Auburn University. He has continued independent consulting since joining Iowa State University. Duties as a consultant range from conducting seminars on advanced techniques in power systems analysis and planning to specification, design review and testing of Energy Management System software, especially state estimation. One interesting duty was to review probabilistic system planning and decision analysis tools for wholesale market analysis. Previous assignments include: energy center organization, specification review, review the state of the art for energy management systems, and recommend the priority for research in each area for a major computer vendor. Dr. Sheblé was also an expert witness on an electrocution case, a software engineering case, and a business development case. His most recent case is analysis of the ground current flows from an HVDC system.

2009 – 2012: Executive Advisor and Senior Director US R&D, Quanta Technology, LLC. **Dr. Sheblé** is a consultant in the areas of Smart Grids, Micro Grids, Energy Management Systems, Risk Assessment, Capital Budgeting, Real Option Analysis, Project Risk Management, Risk Management, Renewable Energy Resources, and Sustainable Systems. Dr. Sheblé directs the research and development activities across all business areas and coordinates conference activities for Quanta Technology. Dr. Sheblé provides technical leadership on phasor measurement projects ranging from transient and steady state analysis through transient and dynamic analysis. Analysis of wide area phasor measurement for transient and dynamic stability assessment, including fast and slow oscillatory analysis is part of this development. Application development for fast frequency control, voltage control, reactive power compensation, and islanding control are key components of electric power system operation. Distributed energy management system computer architecture is central to the deployment of these analysis and control packages. Dr. Sheblé is also an expert witness in transmission line site analysis.

1980-1986: Senior Consultant, Energy and Control Consultants. **Dr. Sheblé** has participated in the functional definition, analysis and design of power system applications for Energy Management Systems. The range of involvement for automatic power system control has extended from automatic generation control for jointly-owned units to computer-directed arming of relay systems. The range of involvement for on-line network analysis has extended from state estimator observability analysis to voltage control. The range of involvement for power system scheduling has extended from load forecast to unit commitment and medium-term hydro scheduling and hydro-thermal coordination. Dr. Sheblé has been project manager for a Canadian requirements study, a cost-justification study, and project management for three Energy Management Systems as a Software Engineering Manager.

1976-1980: Consultant, Control Data Corporation. He was involved with development of advanced application packages. **Dr. Sheblé** developed a unit commitment program package. He was also involved with the Dispatcher Training Simulator design and development. **Dr. Sheblé** designed real-time and scheduling applications for a Canadian Energy Control Center, including automatic generation control of hydro units, transmission limit selection, transmission limit calculation, energy resource scheduling and accounting, and all related programs. His project responsibilities included supervision and development of models for the allocation of reserve regulation margin for the Electric Power Research Institute study of improved economic operation of power systems - system control performance (RP-1048-1). Responsibilities included negotiations and approval of specifications, consultation, customer training, proposal preparation, marketing support, computer resource estimating and evaluation, and manpower planning estimation. He implemented advanced techniques for software engineering such as document databases and system emulation for prototyping.

1975-1976: Engineer, Systems Control, Inc. **Dr. Sheblé** was involved with long and short-term optimal hydro-thermal-interchange scheduling, concentrating in probabilistic production costing. He reviewed software requirements for large and medium-sized Energy Control Center operations. He designed and developed network analysis and schedule analysis

software proposals for three large-sized Energy Management Systems. He was involved in the Electric Power Research Institute study on coherent generation identification (RP904-2). He was also a member of the research team involved in ERDA study of energy conversion, delivery, and utilization.

1971-1973: Methods Engineer, Commonwealth Edison. **Dr. Sheblé** was involved in the development of a large Newton-Raphson power flow. Designed and developed transient stability save case database. Restructured network reduction programs to halve core requirements and provided additional features. He also evaluated requirements for implementing state estimator on Leeds and Northrup Energy Management System. He designed a new database, including the support programs, for a fully integrated system planning power system analysis package.

### **Project Experience Outline (Number of Projects 55):**

Australian Energy Research Institute (AERI)

2012-2013

Consulting (UNSW)

Developed plan to develop three (3) laboratories for solar flagships research infrastructure program (SFRI - AU\$4.5 million dollars). Phasor Measurement Unit (PMU) lab based on the PG&E prototype development laboratory with information from Vahid Madani of Pacific Gas and Electric (PG&E). The PMU lab would include an interface to a RTDS simulation for the state of New South Wales and a data concentrator to execute functions such as three phase state estimation, contingency analysis, device control (transformer, shunt and series capacitors/reactors), voltage instability analysis and prediction, and demand forecasting. Dispatcher Training Simulator lab would include a simulation of the entire Australian electric power system with interconnection of the three major areas using HVDC links. The DTS lab would interface with the PMU lab through the phasor data concentrator. Market Training Simulator (MTS) laboratory would simulate the Australian energy and ancillary service markets with a feed from the real-time markets. The MTS would interface with the DTS to confirm the contracts traded for available transmission capacity (ATC). The MTS would enable testing of trading software for renewable generation resources against the national electric market (NEM). The National Electricity Market (NEM) is the name of the Australian wholesale electricity market and the associated synchronous electricity transmission grid. MTS would emulate trading of the solar cell roof system, the Tyree Energy Technology Building CHP, and energy storage against real-time data.

Alstom-ESCA (ARIVA)

2000-2002

Expert Witness

Provided expert testimony for plaintiff in lawsuit involving intellectual property rights. Expert duties include literature search, background search, expert reports, rebuttals, and deposition.

## AUSGRID

Consulting (UNSW)

2012-2013

Developed workshops on tariffs for renewable generation resources including combined heat and Power (CHP). Developed research plan for six (6) projects to optimize planning based on reliability analysis, including financial analysis using real option analysis.

Baltimore Gas & Electric Company, Baltimore, MD

Systems Engineer

1975-1976 (SC)

Developed initial system design of network analysis and schedule analysis programs.

Bonneville Power Administration (BPA), Vancouver, WA

Subject Matter Expert – Energy Management Systems

2014 – Present (MAXISYS)

Examine improvements to state estimation to improve convergence statistics and to generate data for operations planning and outage management. Develop other computer structures to improve real time network analysis response and throughput.

British Columbia Hydro and Power Authority, Vancouver, BC, Canada

Project Consultant

1981-1983 (ECC)

Extensive feasibility/requirements and cost justification study with: advanced centralized relay control, generation shedding, and schedule analysis, and outage schedule management programs; prepared procurement specification and prequalification specification for Energy Management System.

Burbidge Mitchell and Gross

2010-2011 (QT)

Provided electric and magnetic field analysis for right of way requirements across Montana, Idaho, and Utah. Served as expert witness in case to defend use of land for agriculture and tourist interests.

California Independent System Operator (CAISO)

Consultant

2006 (Gerald **Sheblé** epmt)

Defined financial engineering procedure to justify pumped storage capital budget when integrated with independent wind generation. Provided spreadsheet examples based on energy market, reserve market, and reliability.

Commonwealth Edison Company, Chicago, IL

Methods Engineer

1971-1973 (COMED)

Responsible for research, development, and implementation of power system planning package: Newton-Raphson power flow, network reduction, dynamic stability, transient stability and all associated databases.

Commonwealth Edison Company, Chicago, IL  
Consultant

1994 (Gerald **Sheblé** epmt)

Reviewed software for probabilistic system planning. Outlined analysis procedures for transmission access management.

Compania de Electricidade de Macau (CEM)

Subject Matter Expert

2010-2011 (QT)

Provided transmission and distribution planning support for the ten year expansion plan. Analysis included power flow, fault analysis, contingency, and reliability of the Macau power system.

Control Data Corporation (EMPROS), Minneapolis, MN

Consultant

1988 (Gerald **Sheblé** epmt)

Review of Life-Cycle Costing and Risk Assessment Seminar. (Decision Analysis). Developed training material for marketing under life-cycle costing analysis.

Decision Systems, Inc.

Consultant/Workshop Instructor

1998-1999 (Gerald **Sheblé** epmt)

Provide key components of workshops offered internationally. Workshops conducted in Madrid, Spain, Amsterdam, Netherlands, and Miami, Florida.

Department of Energy (DOE), Washington DC

Methods Engineer

1976 (SC)

Member of research team to determine most efficient method of energy delivery (e.g., electric, gas, hydrogen) to the public (residential, commercial, and industrial).

Delmarva Power & Light, Wilmington, DE

Engineer

1975-1976 (SC)

Developed initial system design of network analysis and schedule analysis programs.

Electric Power Research Institute, Palo Alto, CA

Project Consultant

1976-1979 (CDC)

Proposed and developed methodology and designed algorithmic software for cost of regulation research project.

Electric Power Research Institute, Palo Alto, CA

Engineer

1975-1976 (SC)

Member of research team to develop reduction methodology of power system and components based upon coherency techniques.

Electric Power Research Institute, Palo Alto, CA

1994-1995 (ISU)

Review Genetic Programming and Algorithm software at the Santa Fe Institute for power system application. Develop C++ software for electric market simulation. EPRI Auction Market Simulator available for WWW downloading as of April, 1997.

Electricite Do Portugal (EDP)

2002-2003 (INESC)

Valuation Expert

Prepared methods for Real Option Analysis to value generation and transmission assets.

Electrotek

Santa Cruz, CA

Consultant

1997-1998 (Gerald **Sheblé** epmt)

Prepared workshops on auction markets and on economics for engineers in Eastern European countries for USAID. Workshops conducted in Warsaw, Poland and in Ames, Iowa.

EPIC Consulting, Inc.

1994-1995 (Gerald **Sheblé** epmt)

Santa Cruz, CA

Assisted with survey on research and development needs for the Electric Power Research Institute.

ETREMA, Inc.

1997-1998

Ames, Iowa

Reviewed power requirements for heat treatment system on a water pipe lining system and for power electronic interference on an oil recovery system...

Florida Power & Light, Miami, FL

Engineer

1975-1976 (SC)

Developed initial system design of network analysis and schedule analysis programs.

Florida Power and Light Company Miami, FL

Project Consultant

1982-1983 (ECC)

Extensive load management requirements study to implement load management as an integral part of existing Energy Management System including schedule analysis and power system control programs.

Georgia Power Company, Atlanta, GA

Consultant

1990 (Gerald **Sheblé** epmt)

Reviewed operation of control centers, number of control centers reduced to one, organization restructured to maintain service.

G. Daniel Gildemeister

2000-2001 (Gerald **Sheblé** epmt)

Expert Witness

Provided expert testimony for plaintiff in lawsuit involving electrical services. Expert duties include literature search, background search, and expert reports.

Harris Corporation/Controls Division

Consultant

1989 (Gerald **Sheblé** epmt)

Human Factors design of person/machine Interface. New Graphics interface includes spider charts, row bands, etc., as designed for new system architecture.

Hitachi USA, EMS

Subject Matter Expert

2012 (QT)

Provided business strategy for expanding market share in energy management system product line including phasor analysis extensions of classical EMS functions.

Howarth & Smith

2005 – Present (Gerald **Sheblé** epmt)

Expert Witness

Providing expert testimony on grounding of High Voltage Direct Current System and Project Documentation for combined jointly owned power plant and High Voltage Direct Current System project. Provided opinion on ground stray current flows.

Hydro Quebec, Montreal, Quebec, Canada

Project Consultant, Development Team Leader

1976-1979 (CDC)

Proposed, managed, defined, designed, and negotiated basic and advanced power applications: Automatic Generation Control, Reserve and System Monitoring, Interchange Management and Scheduling, Hydro Management and Scheduling, and Resource Management and Scheduling.

Indianapolis Power & Light Company, Indianapolis, IN

Project Manager

1981-1985 (ECC)

He developed cost/benefit justification and requirements for Energy Management System replacement study. He developed procurement specifications for power system control and monitoring including network analysis, schedule analysis, and dispatcher training simulator functions. He assisted bid evaluation and work statement negotiation. He provided project management assistance including project schedule analysis, functional design documents review, documented project meetings and assisted negotiation strategy. He also developed data base standards for power system applications.



Instituto de Engenharia de Sistemas e Computadores do Porto  
(Institute for Systems and Computer Engineering in Porto - INESC)

Project Manager

2008 – 2010

Developed energy market simulator for the emulation of European Energy Markets, especially the Iberian Market. Directed work of senior scientists, most of the work was at the doctoral level. Work resulted in a market simulator design capable of multiple round play and of multiple commodities.

Los Angeles Department of Water and Power,  
Intermountain Power Project, Los Angeles, CA

Project Consultant

1981-1982 (ECC)

He performed extensive review of feasibility/requirements study of remote generation control (regulation) via HVDC Link as an integrated part of a new Energy Management System.

Martin Wilhelm Associates

2001 – 2003

Valuation Expert

Provided white paper assistance for Edison Electric Institute and for other clients. Provided assistance with project proposals.

Munger & Reinschmidt

Sioux City, Iowa

Expert Witness

1995-1996 (Gerald **Sheblé** epmt)

Provided expert testimony for plaintiff in lawsuit involving electric shock and electrocution due to improper wiring leading to a back feed. Expert testimony identified conditions leading to the back feed due to improper configuration of equipment and improper wiring of lighting fixtures.

Network Management Technology, Inc., Sugar Land, TX

Consultant

1994-1995 (Gerald **Sheblé** epmt)

Review software specifications and proposal for power pool operation and scheduling for the state of New York.

New Brunswick Electric Power Commission Fredericton NB, Canada

Engineer

1975-1976 (SC)

Installed an equivalent load duration curve hydrothermal interchange coordination software system that minimized cost on a weekly and yearly basis.

Newfoundland and Labrador Hydro, Saint Johns, Canada

Project Manager

1984-1985 (ECC)

Extensive feasibility/requirements study for new energy Management System that included review of all operating procedures, of all local and central control equipment, of digital microwave system, and of operations staffing organization.

New York Independent System Operator (NYISO), NY

Technical Lead (QT)

Executive Advisor

2010 – 2012

Provide expertise in the integration of phasor measurements into the energy management system (EMS), especially the state estimation algorithm and other energy management system functions. Implementation of a fast frequency controller, voltage controller, fault analysis, voltage stability, and islanding relaying are part of the deployment activity with the Phasor Measurement Network (PMN) in parallel with the EMS. Lead computer architecture design and analysis of communication requirements. Project shows the evolution of EMS to include phasor measurements and phasor applications.

Nova Scotia Power Corporation, Halifax, NS, Canada

Project Consultant

1976-1977 (SC)

Evaluated and authored report cost/benefit analysis of energy scheduling applications.

Nova Scotia Power Corporation, Halifax, NS, Canada

Project Consultant

1976-1977 (SC)

Evaluated and authored report on requirements for Energy Management System: scheduling applications, network analysis, power system control and monitoring, including the operations structure to support these programs.

Ormat Technologies, Inc.

Subject Matter Expert (QT)

2012

Performed interchange capability analysis for a leading vertically integrated company dedicated to providing solutions for geothermal power, recovered energy generation (REG) and remote power in the Pacific Northwest.

Orrick, Herrington & Sutcliffe

2000-2002

Expert Witness

Provided expert testimony for plaintiff in lawsuit involving intellectual property rights. Expert duties include literature search, background search, expert reports, rebuttals, and deposition.

Pacific Gas and Electric, CA  
Executive Advisor (QT)  
EMS expert/PMU Application Expert  
2010 – 2012

Provide expertise in the integration of phasor measurements into the state estimation algorithm and other energy management system functions. Implementation of a fault analysis, distributed linear state estimator, system calibrator, voltage controller, fault analysis, black start and islanding relaying are part of the deployment activity of the integrated Phasor Measurement Network (PMN) and EMS.

Project Manager Blackstart and Restoration PMU Project

Directed studies to extend phasor measurement units into fast control of restarting and cranking path for system restoration. Directed system analysis including electromagnet transients, transient stability, and power flow. Studies included use of RTDS for DTS simulations.

Pennsylvania, New Jersey, & Maryland (PJM) Interconnection, LLC

Subject Matter Expert (QT)

2010-2011

Provided design and analysis of extending traditional EMS to include phasor measurements.

Provided support for CIM extensions to support phasor measurement equipment (synchrophasors). Provide future functional design to integrate phasor measurement functions from the VaTech/Dominion project into the PJM footprint.

Philadelphia Electric

Project Consultant

1982-1985 (ECC)

Conducted requirements study for Energy Management System including network and schedule analysis, pool operation, real and reactive power control, observability study.

Peugeot Sound Power and Light

Project Consultant

1985 (ECC)

Conducted requirements study for network and schedule analysis programs and Dispatcher Training Simulator.

Puerto Rico Electric Power Authority, San Juan, PR

Project Consultant

1981-1984 (ECC)

Review functional specification and design specification documents for all power applications, and developed model standards for all network analysis and schedule analysis programs; extensive review of control and scheduling of combined cycle units. The tasks included justification, specification, procurement and installation of SCADA system for transmission and distribution. This included inventory of all assets in transmission and distribution.

Rogue River Wind

Generation Modeling and Manufacturing

2008 – 2010 (Gerald **Sheblé** epmt)

Provide assistance with manufacturing process of ducted wind generator for urban environment.

Salt River Project, Phoenix, AZ

Project Manager

1981-1985 (ECC)

Assisted bid evaluation (using modified version of Kepner-Tregoe methods), work statement negotiation, functional and design specification document review, and acceptance test document review.

Seminole Electric Cooperative

Project Consultant

1984 (ECC)

Conducted requirements study for network and schedule analysis programs and Dispatcher Training Simulator.

Shared Applications, Inc. Ann Arbor, MI

Project Consultant

1976-1978 (CDC)

Reviewed research and development of advanced applications for Control Data Corporation.

Southern Company Services, Inc., Birmingham, AL

Consultant

1990 (Gerald **Sheblé** epmt)

Reviewed Energy Management System Request for Proposal. Proposal updated and released, under implementation.

Stolpman, Krissman, Elber, and Silver, LLP, Long Beach, CA

2012-present (Gerald **Sheblé** epmt)

Expert Witness

Providing expert opinion on grounding of distribution system which caused stray currents in the neighborhood surrounding substation.

Sunflower Electric Cooperative

Project Consultant

1983 (ECC)

Conducted requirements study for network and schedule analysis programs and Dispatcher Training Simulator.

Tri-State Generation & Transmission Association, Inc. Denver, CO

Project Manager

1981-1985 (ECC)

Project management phase activities included review of design documents, review of acceptance test documents, responsible for applications test team during Factory Acceptance Tests.

VaTech ARRA project with Dominion Electric, VA as partners

Executive Advisor (QT)

2010 – 2012

EMS/PMU Architecture Advisor

Software Project Management

Implementation of a linear three phase state estimation algorithm to execute once a second is part of the prototyping activity. Sensor calibration and automatic islanding detection are included advanced phasor applications within this project. Provide expertise in the integration of phasor measurements into the EMS state estimation algorithm and other energy management system functions.

## V. HONORS AND AWARDS

Phi Kappa Phi, Eta Kappa Nu, Omega Rho, New York Academy of Sciences (1995-2003), Erskine Fellow (University of Canterbury, Christchurch, New Zealand, 1999 - present), INESC Fellow (University of Porto, award date October 1, 2008).

### **IEEE Fellow Citation for GERALD BERNARD SHEBLÉ (1996):**

For contributions to the development of Auction Methods as an alternative to power system optimization methods addressing the de-regulation of the electric utility business.

**Invited Visiting Professorship**, University of Porto, Member of International Advisory Board, Department of Electrical Engineering, 2003-2010. Advisor to the Department of Electrical and Computer Engineering. Instructed courses in power system analysis, auction markets and energy economics.

**IEEE Distinguished Lecturer (2003 - present)** (Computer Auction Markets, Risk Analysis and Risk Management, Demand Side Management Strategies for Competition, Generation Valuation by Real Option Techniques, Economics of Competition, Porter's Five Forces, Supply Chain, and Leontief Modeling of Composition, Game Theory and Bidding Strategies, Artificial Life Techniques for Simulation of Optimization, Transmission Valuation by Real Option Technique)

**Graduate Faculty, University of Arkansas, Little Rock, Arkansas (UALR)**. Accepted doctoral advisor on data mining project applied to valuation and to reserve assessment of oil field throughout the world. Invited by Professor Daniel Berleant, professor of Information Science at the University of Arkansas at Little Rock

## VI. ACADEMIC AREAS OF SPECIALIZATION

### **Teaching at University of New South Wales (Semester)**

1. EE&T Introductory Power Analysis (2013 F)
2. EE&T Introductory Materials and Fields (2013F)

**Teaching at University of Porto (FEUP) (Semester)**

1. ECE Market Simulation (2008S)
2. ECE Market Simulation (2009S)

**Teaching at Portland State University (Quarter)**

1. ECE 442            Power System Analysis II (2006W)
2. ECE 510(541)    Transmission Operation and Control (2007F, 2008F).
3. ECE 510(542)    Generation Operation and Control (2007W, 2008W, 2009W)
4. ECE 543    Energy System Steady State Analysis (2006S)
5. ECE 510(547)    Energy System Economics (2006F, 2008F)
6. ECE 510    Energy System Supply Chain Optimization and Facility Location (2007F)
7. ECE 610(642)    Energy System Capital Budgeting (2006F, 2008W)
8. ECE 610(647)    Sustainable Energy Resources (2007S, 2008S with Dr. B. Lusignan)
9. ECE 510    Market Simulation Computational Intelligence (2009W)
10. PA 510    Smart Grid Seminar (2009W)

**Teaching at Iowa State University (Semester)**

1. ENGR 161            Introduction to Engineering/C (2000S, 2000F-team leader)
2. ENGR 162            Introduction to C++ (1996F, 1998F, 1999S, 2000F, 2001S-team leader)
3. ENG-5    System Optimization & Simulation (2002S)
4. EE 251    Introduction to Modern Power Systems (1995F)
5. EE 303    Introduction to Modern Power Systems (2005S)
6. EE 388X    Sustainable Engineering (2005F) team teaching
7. EE 351    Electromagnetic Devices (1990F, 1990S, 1991F)
8. EE 441    Introduction to Circuit, Instrumentation & Electronics (1992F, 1993F)
9. EE 456    Power System Analysis I (1993F, 2004F)
10. EE 457    Power System Analysis II (1994S, 2005S)
11. EE 461    Electrical System Design I (1990F, 1992S)
12. EE 462    Electrical System Design II (1990S, 1992F)
13. EE 553    Steady State Analysis (1995F, 1998F, 1999F, 2000F, 2003F)
14. EE 594    Seminar in Electric Power (1991F)
15. EE 653ex    Power System Optimization (1992S, 1993S, 1997S)
16. EE 653a    Power System Operation and Control (1994S)
17. EE 653f    Power System Deregulation and Pricing (1998S, 2000S)
18. EE 653d    Power System Planning (2004S, 2005F)
19. CPrE 320    Software Engineering (1996F, 1996S)
20. CPrE 458    JAVA Programming and Data Structures (2004S)
21. STAT 333            Statistics and Probability for Engineers (1995F, 1995S)

## **Teaching at Other Universities**

### **University of Porto (Sabbatical Leave 8/2002 through 8/2003)**

- Electric Markets Graduate course module (Spring 2003)
- Market Simulation (Summer 2008)

### **University of Canterbury, Christchurch, New Zealand, Erskin Fellow**

- Electric Markets Graduate course module (Summer 1999)

### **Course Development at University of New South Wales**

Reliability analysis of power systems for operations and for planning. Providing data for financial analysis as real options. Probabilistic production costing with network constraints as the focal point to underscore wholesale market analysis and emulation.

### **Course Development at Portland State University/FEUP/MIT Portugal/CMU Portugal**

Market Simulation with Adaptive Agents: Semester based course in MIT Portugal Sustainable Systems Engineering doctoral program, developed material in conjunction with professors from consortium.

### **Course Development at Portland State University (Quarter)**

1. ECE 510(541) Generation Operation and Control: Power System Operation and Control: Developed material to extend regulation of power systems with competitive market models and solutions. Developed material to include Linear Programming as the major tool for all optimization problems. Taught as directed reading 2007 as course enrollment was low.
2. ECE 510(542) Transmission Operation and Control: Power System Operation and Control: Developed material to extend regulation of power systems with competitive market models and solutions. Developed material to include Linear Programming as the major tool for all optimization problems.
3. ECE 510(546) Energy System Economics: Developed material to extend Storbac and Kirschen text Power System Economics to include competitive market models and solutions for various energy systems. Various energy system solutions include natural gas pipeline network, coal delivery networks (train, barge, shipping, and pipeline), and oil delivery network (shipping). Taught every fall since 1998 either as a course or as a directed reading.
4. ECE 610(643) Energy System Capital Budgeting: Developed material to extend capital budgeting material to include electric energy markets (real power, reactive power, spinning reserve, load following, and energy balancing) based on re-regulation of power systems with competitive market models and solutions. Developed material to include decision analysis, real option analysis and linear programming as basic optimization tool.

5. Chaired Energy Curriculum Committee to restructure undergraduate and graduate Electrical Engineering curriculum at Portland State University, result was a complete overhaul of courses (required and elective) and course sequence, 2006.
6. ECE 510(548) Digital Power System Protection (jointly with Dean Miller, 2007S) with software (MATLAB) development.
7. ECE 610(641) Power System Planning (jointly with Tom Waters, 2007W) with material and software development (MATLAB).
8. ECE 610(647) Sustainable Energy Systems (jointly withy Bruce Lusignan, 2007S) with case preparation and software development. Developing models of renewable distributed generation as an integral part of the power system. Developed tools for decision analysis, reliability analysis, risk management, and scheduling.
9. ECE 510 Market Simulation with Adaptive Agents, jointly with FEUP/MIT Portugal/CMU Portugal as part of Sustainable Energy System Doctoral program.

### **Course Development at Iowa State University (Semester)**

1. EE 251 Introduction to Modern Power Systems Analysis: Developed material for new course text for sophomore level course. Contributed chapters included: Distribution Analysis, Operation and Optimization, and Harmonic Analysis. MATLAB Computer Assisted Instruction modules developed included: distribution analysis, economic dispatch, automatic generation control (steady state and transient). Chapters 4, 6, and 8 deal with distribution, operation, and harmonics. Received NSF/EPRI grant to develop several new MATLAB based modules.
2. EE 388X, Sustainable Engineering: Developed laboratory experiments and learning modules for Demand Side Management and Distributed Generation, first taught fall 2005.
3. ENG-5, System Optimization & Simulation (2002S): Systems Engineering Program, Joint program with the University of Iowa.
4. EE 553, Power System Operation and Control: developed material to extend regulation of power systems with competitive market models and solutions. Taught every fall since 1998, taught as directed readings twice in that period as course enrollment was low.
5. IE/EE 567 System Modeling, Simulation, & Optimization: The modeling of these system processes as discrete dynamic time dependent processes addresses this need. The following list of topics are addressed in this systems engineering course sequence: Background/history of control engineering, The modern control modeling process, System requirements analysis as performance index, Mathematical Description of Systems, Solutions of Discrete and Continuous Systems, Controllability and Observability, Design for compensation, Design for optimal control response, Design for adaptive control, Case studies of corporate and market models, Case studies of divisional response models, Case studies of computerized bidding systems. To be taught as part of the ISU/UOI joint degree program in spring 2002.
6. IE/EE 568 Artificial Life Techniques for Systems Simulation and Optimization: The modeling of system processes as required by the discrete, uncertain, and often time dependent processes can be solved with these techniques. The following list of topics are addressed in this systems engineering course: Background/history of artificial life techniques, Artificial Neural Networks for forecasting, Artificial Neural Networks for optimization, Genetic Algorithms for optimization, Expert Systems for optimization and for bidding systems, Fuzzy logic for optimization and for bidding systems, Genetic Programming for optimization and for bidding



- systems, Constraint Satisfaction for optimization and for bidding systems, Evolutionary Programming for optimization and for bidding systems. To be taught as part of the ISU/UOI joint degree program in spring 2002.
7. IE/EE 569 Software and Systems Engineering with UML: The Unified Modeling Language (UML) has gained popular approval as the next improvement in specification languages. This is one aspect of CASE design that is the hardest to implement. Design patterns are also included. The importance of object reuse is central to software process control and project efficiency. Software planning and estimating is included to provide the basic feature points and COCOMO II. Synchronize and stabilize life cycle technique is included. Software testing and process improvement is included. Software process is language independent. However, a language has to be selected to provide examples. The few code examples are in C++. However, the student is assumed to be aware of only one of the high languages. To be taught as part of the ISU/UOI joint degree program in fall 2002.
  8. EE 653x Power System Applications of Decision Analysis and Decision Theory: The modeling of these system processes as discrete dynamic time dependent processes addresses this need. The following list of topics are addressed in this systems engineering course sequence: Background/history of control engineering, The modern control modeling process, System requirements analysis as performance index, Mathematical Description of Systems, Solutions of Discrete and Continuous Systems, Controllability and Observability, Design for compensation, Design for optimal control response, Design for adaptive control, Case studies of corporate and market models, Case studies of divisional response models, Case studies of computerized bidding systems. Taught in spring 2000.
  9. EE 653f Power System Deregulation and Pricing/Economics and Finance: Developed material to illustrate the techniques used for power system pricing in a deregulated environment. Techniques are closely related to general economics, finance, optimization, decision analysis, risk assessment, and project selection. Economics for Engineers text is supplemented with papers and class notes to illustrate the practical aspects of implementation. Taught in spring 1998.
  10. CPRE320 Software Engineering Course: Developed VCR projects. Initiated projects on: PLC interpreter and run-time code, ATM machine, automobile controller, and expert system developer. The Stock Market game project has become a senior design project. The product may be used for undergraduate and graduate courses in finance and economics. The product includes a special “calculator” to generate the time series, new events, and maintain records of players.
  11. EE 653d Power System Planning: Developed material to illustrate the techniques used for power system planning. Techniques are closely related to general optimization, decision analysis, risk assessment, and project selection. Extensive material developed on reliability of transmission and generation systems. Material is supplemented with a handbook to illustrate the practical aspects of implementation. Taught in spring 2004, fall 2005...
  12. EE 653a Power System Operation and Control: Developed course on Transmission Access in a less regulated environment with emphasis on service costs, pricing implementation, and reliability. Developed and presented lectures on interchange evaluation, introduction to commodity markets, constrained economic dispatch and auction methods. Taught in Spring 1994 and Fall 1994

13. Chaired Curriculum and Ad-hoc Committee to restructure undergraduate Electrical Engineering curriculum at Iowa State University, result was a complete overhaul of courses (required and elective) and course sequence, 1993.
14. EE 653ex Power System Optimization - offered spring 1992, 1993 and 1997: Developed course to cover the optimization techniques best suited for the most critical problems in power systems operation and power system planning. The developed material explains the problems to be solved and the interrelationships between these problems. It is very important for the student to realize that optimization is all too often done in a vacuum without regard to interrelated issues. Material is supplemented with a general optimization text to maintain the proper perspective of practice and theory.
15. EE 594 Research Issues in Computer Analysis of Power Systems (1991F): Special Topics Course. Course simultaneously offered at University of Wisconsin, University of MissouriRolla, and Iowa State University. Dr. Sheblé organized the course schedule, prepared course syllabus, and organized use of audio graphics equipment. Dr. Sheblé presented four lectures on Genetic Algorithms: Basic Concepts, Data Encoding, Comparison to Simulated Annealing, Examples in Economic Dispatch and Unit Commitment. Course used audio graphics to connect all three universities and off-campus students.
16. Chaired working group to restructure graduate power system courses at ISU, result was a complete overhaul of course sequence, two core courses identified and to be offered beginning Fall 1991.

#### **Teaching at Auburn University (Quarter)**

This information is available upon request.

#### **Course Development at Auburn University (Quarter)**

1. Auburn University, Associate Professor, 1986-1990: Spacecraft and terrestrial power systems, system theory and optimization.
2. Introduced a new course in Electrical Engineering on Power System Control and updated the courses on Power System Operation, Power System Planning and Pattern Recognition. Introduced a new course on linear and non-linear optimization for power systems and developed several personal computer applications for the undergraduate and graduate power courses.

#### **Teaching at Virginia Tech University**

This information is available upon request.

#### **Course Development at Virginia Tech University (Semester)**

1. Virginia Tech, Instructor of Electrical Engineering, 1978: System theory, energy conversion, and energy conversion for non-electrical engineering majors. Counseled undergraduate students.

## Research

1. Electric Power Systems Optimization for Operation and Planning
2. Expert Systems Building Using Genetic Algorithms for Data Mining and Strategy Building
3. Financial Engineering, Real Option Analysis, Decision Analysis and Decision Theory for Electric Energy Markets & Systems
4. Finite element analysis real options, electric and magnetic fields
5. Computational Intelligence Algorithms for optimization, forecasting, and pattern recognition

## VII. GRANTS AND CONTRACTS

(Joint funding is broken into the segments for which Dr. Sheblé was responsible and shown in parentheses. Dr. Sheblé has been responsible for 48 projects for a total research funding of \$2,806,776 since 1986. Total funding including equipment gifts amounts to \$2,920,924.

### Submitted - Not Yet Awarded

These are proprietary information at Gerald **Sheblé** epmt, Inc.

### Active Research Funding (\$)

These are proprietary information at Gerald **Sheblé** epmt, Inc.

These are proprietary information at MAXISYS Inc.

### Total Research Funding (\$3,570,784)

The following projects list identifies the co-principal investigators (if any), the funding agency, the project title, the duration of the project, and the amount of financial responsibility in parenthesis, for **Dr. Sheblé**.

#### University of New South Wales (\$650,000)

1. **PI: Gerald B. Sheblé**, “Capital Budgeting of Renewable Resources using Real Option Analysis,” Australian Energy Markets (NEM) (UNSW), 6/1/2012 – 6/1/2015 (\$170,000/year)
2. **PI: Gerald B. Sheblé**, “Market simulation of Australian Energy Markets (NEM),” Energy Australia (UNSW), 7/1/2012 – 6/1/2013 (\$50,000)
3. **PI: Gerald B. Sheblé**, “Phasor Measurement Unit Data Concentrator,” Energy Australia (UNSW), 7/1/2012 – 6/1/2013 (\$50,000)
4. **PI: Gerald B. Sheblé**, “Dispatcher Simulator Integrated with Phasor Measurement Unit Data Concentrator,” Energy Australia (UNSW), 7/1/2012 – 6/1/2013 (\$40,000)

#### INESC PORTO/University of Porto (\$139,900)

1. **PI: Gerald B. Sheblé**, “Market Simulation,” Portuguese Federal Scientific Funding Agency, €100,000, 12/31/08 - 6/1/10 (\$139,900).

**Portland State University (\$527,000)**

1. Pi: Gerald B **Sheblé**, “Development of Market Simulation Course and Software,” University of Porto/Portland State University, April 1, 2008 – April 1, 2009, continuing university collaboration between University of Porto (FEUP)/Carnegie Mellon (CMU)/ Massachusetts Institute of Technology (MIT)/Portland State University (PSU), (\$77,500,€48,650).
2. PI: **Gerald B. Sheblé**, “Energy System Information Assessment and Management,” Maseeh Professorship 2009 (\$40,000).
3. PI: **Gerald B. Sheblé**, “Energy System Economic Assessment and Risk Management,” Josh Bratt (Morgan Stanley), 2009 (\$5,000).
4. PI: **Gerald B. Sheblé**, "Distribution System Efficiency Study," Portland General Electric, \$22,000, 06/01/06 - 12/31/08.
5. PI: **Gerald B. Sheblé**, Craig Shin, et. al., “Seminar Series on Technical, Economic, and Political Hurdles to Smart Grids, Distributed Generation, Demand Side Management, and Electric Vehicles,” Portland General Electric, \$57,000, 12/31/08 - 6/1/09 (\$30,000).
6. Pi: Gerald B **Sheblé**, “DC Brushless Machine Model Development for axial and radial machine,” Rogue River Wind Company, amount: \$45,000.00, September 2007 – April, 2008, an additional two terms of funding for 2008 (\$45,000).
7. PI: **Gerald B. Sheblé**, “Energy System Information Assessment and Management,” Maseeh Professorship 2008 (\$40,000).
8. PI: **Gerald B. Sheblé**, “Energy System Information Assessment and Management,” Maseeh Professorship 2007 (\$40,000).
9. PI: **Gerald B. Sheblé**, “Energy System Economic Assessment and Risk Management,” Josh Bratt (Morgan Stanley), (\$10,000).
10. PI: **Gerald B. Sheblé**, "Computer Simulation of an Electric Marketplace by Agents Seeking Reliability," National Science Foundation, \$51,000, 03/01/06 - 08/31/08 (transferred from ISU).
11. Consultant: A. P. Meliopoulos (GIT), Gerald B. Sheblé (PSU), “Distributed State Estimation with Application to Alarm Processing,” PSERC Fall 2005 Proposal for two year project, 80,000 per year (\$20,000), 2006 - 2007.
12. PI: **Gerald B. Sheblé**, “Energy System Information Laboratory,” Portland State University Development Initiative, 2006 (\$100,000), 2006 - 2008.
13. PI: **Gerald B. Sheblé**, “Energy System Information Assessment and Management,” Maseeh Professorship (\$40,000), 2006.

**Iowa State University (\$1,523,224)**

1. PI: **Gerald B. Sheblé**, “LMP Market Generator Offer Analysis,” Alliant Energy, one graduate student, EPRC, remained at Iowa State University, \$36,500, September 2005 – August 2006.
2. PI: **Gerald B. Sheblé**, “Project Title: Agent Modeling for Integrated Power System, Power and Fuel Market Simulation, “ PSERC, \$160,000, \$70,000 ISU, Co-Principle Investigators, Anjan Bose (WSU), Judith Cardell (Smith College), Industrial Team: Mark Sanford, GE Energy, Jianzhong Tong, PJM Interconnection, Jay Giri, AREVA T&D Corporation, James Price, California ISO, remained at Iowa State University (\$70,000).

3. **Gerald B. Sheblé**, "Computer Simulation of an Electric Marketplace by Agents Seeking Reliability," National Science Foundation, \$109,999, 09/01/02 - 08/31/06, one year extension granted, remainder of funding shown in PSU activity.
4. **Gerald B. Sheblé**, "Uncertain Power Flows and Transmission Expansion Planning," Co-Principle Investigators, Gerald T. Heydt (ASU), Peter Sauer (University of Illinois), PSERC, \$160,000, \$80,000 ISU, 5/2004-5/2006 (\$80,000).
5. **Gerald B. Sheblé**, "Natural Gas Forward Price Curve and Unit Heat Rate Characteristic Curve Data Mining Project," Mid-American project, \$18,600 (4 graduate students), August 15, 2004 – December 31, 2004, funded through ISU EPRC.
6. **Gerald B. Sheblé**, "Natural Gas Forward Price Curve and Unit Heat Rate Characteristic Curve Data Mining Project," Mid-American project, \$37,200 (2 graduate students), August 15, 2003 – August 14, 2004, funded through ISU EPRC.
7. **Gerald B. Sheblé**, "Price Determination of Electricity in a Competitive Environment," MidAmerican project, \$36,000, August 15, 2002 – August 14, 2003, funded through ISU EPRC.
8. **Gerald B. Sheblé**, Daniel Berleant, and Robert Thomas (Cornell), "Market Interactions and Market Power," PSERC, June 1, 2000 – August 14, 2002, \$70,000 (\$60,000 ISU) (self \$40,000).
9. **Gerald B. Sheblé**, CERTS: FERC Standard Market Design Review, DOE T&D program, July to December 2003, \$7000.
10. **Gerald B. Sheblé** and Leigh Tesfatsion, "Computer Simulation of Electric Marketplaces Using Artificial Adaptive Agents," National Science Foundation, \$309,683, September 1, 1998 - August 31, 2002, (\$154,842).
11. **Gerald B. Sheblé**, "Generation of Forward Risk Curves for Spot Market Play," EPRC/Mid America, \$18,000, January 1, 2002 – December 31, 2002.
12. APT Group (University of Washington, Virginia Tech, Arizona State University, Iowa State University) **Vittal, V.** (P.I.), V. Ajarapu, M.H. Khammash, W. Kliemann, J. D. McCalley, **Gerald B. Sheblé**, L. Tesfatsion, S. S. Venkata (Co-PIs), "Innovative Technologies for Defense Against Catastrophic Failures of Complex, Interactive Power Networks - Cooperative Effort with University of Washington, Arizona State University, and Virginia Polytechnic and State University under a Joint Initiative on Analysis of Complex Dynamical Systems," Electric Power Research Institute-Department of Defense, \$1,481,234 (\$800,000/year-school), November 1, 1999 - October 31, 2004 (\$40,000/year for 5 years).
13. **Gerald B. Sheblé**, "Generation of Forward Risk Curves for Spot Market Play," EPRC/Mid America, \$18,000, January 1, 2001 – December 31, 2001.
14. J. McCalley (PI), V. Ajarapu, **G. Sheblé**, V. Vittal, and S. Venkata, National Science Foundation, \$115,000, "Module Based Multimedia Courseware Development for Power System Education," May 1, 1997 - April 30, 2000. This proposal was submitted jointly with faculty at Virginia Polytechnic Institute (\$28,750).
15. Eric Bartlett and **Gerald B. Sheblé** (PI), "Electric Futures Forecasting with Artificial Neural Networks," EPRC, \$15,000, August 28, 1998 - August 27, 1999 (\$7,500).
16. **Gerald B. Sheblé**, "Operational Planning for Demand Side and Interruptible Load Management," Mid America, \$15,000, August 27, 1999 – October 15, 2000 (continuation).
17. **Gerald B. Sheblé**, "Operational Planning for Demand Side and Interruptible Load Management," Mid America, \$15,000, August 27, 1998 – August 15, 1999 (continuation).

18. **Gerald B. Sheblé**, "Price Determination of Electricity in a Competitive Environment," EPRIMid-American Tailored Collaboration project, \$109,375, January 1, 1998 - December 31, 1999.
19. **Gerald B. Sheblé**, "Price Impact of Transmission Capacity Using FACTS Devices," EPRIMid-American Tailored Collaboration project, \$109,375, January 1, 1998 - December 31, 1999.
20. Eric Bartlett and **Gerald B. Sheblé (PI)**, "Electric Futures Forecasting with Artificial Neural Networks," EPRC, \$15,000, August 28, 1997 - August 27, 1998 (\$7,500).
21. **Gerald B. Sheblé**, "Operational Planning for Demand Side and Interruptible Load Management," Mid America, \$15,000, January 1, 1998 - August 27, 1998 (continuation).
22. **Gerald B. Sheblé**, "Generation Company Bid Strategy Generation and Selection" EPRC, \$22,500, August 28, 1997 - December 31, 1998.
23. **Gerald B. Sheblé**, "Auction Methods Including Ancillary Services," EPRC, \$15,000, August 28, 1997 - August 1, 1998.
24. **Gerald B. Sheblé**, "System Planning for a Deregulated Environment," Engineering Extension, Blackburn Fellowship, \$15,000, August 28, 1997 - August 1, 1998.
25. **Gerald B. Sheblé**, "Operational Planning for Demand Side and Interruptible Load Management," Mid-America, \$24,620, January 1, 1997 - December 31, 1997.
26. **Gerald B. Sheblé**, IPRT/CATD and Pace Health Management, Inc., "Implementation of Genetic Algorithm to Generate Expert System Rules," \$23,862, January-May, 1997. License for software has been signed with ISURF. Transferred to 3M after acquisition.
27. **Gerald B. Sheblé**, Principal Investigator, IPRT/CATD and Pace Health Management, Inc., "Implementation of Genetic Algorithm to Generate Expert System Rules," July 1995 - December 1995, \$11,000.
28. **Gerald B. Sheblé**, National Science Foundation, "Combinatorial Optimization for Transaction Evaluation," \$68,851, September 15, 1995 - February 28, 1997.
29. **Gerald B. Sheblé**, EFTF computer integration projects, "Interchange Auction Markets," J. Kumar, Fall Semester support, August 1, 1995 - December 31, 1995, \$4,296.
30. J. McCalley, V. Ajjarapu, **G. B. Sheblé**, and V. Vittal, Co-Principal Investigators, EFTF computer integration projects, "Interactive Instructional Software for EE 251," September 1995 - May 1996, \$6,300 (\$1,500).
31. **Gerald B. Sheblé**, University Assistantships, Timothy Maifeld, August 23, 1993 - May 13, 1994, \$7,425 (\$0, non-competitive funding).
32. **Gerald B. Sheblé**, Co-Principal Investigator with L. Udpa, "Expert Network Systems for the Analysis of Computer-Based Medical Records," Center for Advanced Technology Development, November 1, 1993 to September 1994, Industrial partner: Health Care Expert Systems, Inc., \$85,155, (\$42,578).
33. **Gerald B. Sheblé**, Principal Investigator, "Expected Cost Penalty Security Constrained Dispatch," Electric Power Research Center, selected, amount \$25,000. Project cancelled by EPRC cutback.
34. **Gerald B. Sheblé**, Principal Investigator, "Combinatorial Auction Mechanism," Electric Power Research Center - January 1993 to December 1993, \$20,000.
35. **Gerald B. Sheblé**, Co-Principal Investigator with J. Lamont, "Distribution System Automation," Electric Power Research Center, January 1993 - December 1993, \$15,000, (\$7,500).

36. **Gerald B. Sheblé**, Co-Principal Investigator with J. Lamont, "Improvements in Generation and Interchange Scheduling," Electric Power Research Center, January 1993 - December 1993, \$15,000, (\$7,500).
37. **Gerald B. Sheblé**, Principal Investigator, "Combinatorial Optimization for Transaction Selection," National Science Foundation, Research Experience for Undergraduates, June 1992, 12 months, \$10,000.
38. **Gerald B. Sheblé**, Rockwell International Excellence Grant, May 1992, \$800.
39. **Gerald B. Sheblé**, Principal Investigator, "Combinatorial Auction Mechanism," Electric Power Research Center, January - December 1992, \$20,000.
40. **Gerald B. Sheblé**, Principal Investigator, "Comparison of Wheeling Costs," Electric Power Research Center, January-December 1991, \$33,500.
41. Jennifer L. Davidson, Principal Investigator and **Gerald B. Sheblé**, Investigator, "Application of ANN to Analyze the Security of a Transient-Voltage Limited Network," Electric Power Research Center, January-December 1991, \$20,100, (\$10,050).
42. **Gerald B. Sheblé**, Principal Investigator, "Combinatorial Optimization for Transaction Selection," National Science Foundation, October 1991, 12 months, \$90,000. Research experience for undergraduates, \$20,000 (\$110,000).

#### **Auburn University (\$616,152)**

1. L. G. Grigsby, Principal Investigator, **Gerald B. Sheblé**, Co-Principal Investigator, Nelms, R. M., Co-Principal Investigator, "AC Power Systems for Space Applications," SDI/Auburn University Space Power Institute, June 16, 1987 to August 31, 1990, 4 years, \$807,455. Responsible for the development of simulation software for spacecraft power systems as CoPrincipal Investigator, responsible for 1/3 of project effort, (\$269,152) while at Auburn.
2. **Gerald B. Sheblé**, Co-Principal Investigator, R. M. Nelms, Co-Principal Investigator, "Trends in Spacecraft Power Systems," Navy Research Lab, June 30, 1989 - September 30, 1989: \$20,000 (\$10,000 per Co-Principal Investigator) while at Auburn.
3. L. G. Grigsby, Principal Investigator, **Gerald B. Sheblé**, Co-Principal Investigator, R. M. Nelms, Co-Principal Investigator, "Network Analysis of Spacecraft Power Systems," Center for the Commercial Development of Space, Oct. 1, 1987 - Sept. 20, 1988, \$217,000, Oct. 1, 1988 - Sept. 20, 1989, \$217,000, Oct. 1, 1989 - Sept. 20, 1990, \$217,000. As Co-Principal Investigator, **Dr. Sheblé** was responsible for 1/3 of project effort, (\$217,000) while at Auburn.
4. **Gerald B. Sheblé**, Principal Investigator and Project Manager, R. M. Nelms, Co-Principal Investigator, "Neutral Particle Beam Power System Demonstrator," Grumman Aerospace for Strategic Defense Command, Oct. 1, 1989 - Nov. 30, 1990, \$240,000 (Phase I). Dr. Sheblé was responsible for half the funding amount (\$120,000) while at Auburn. Dr. Sheblé also assisted as author of the proposal to the Strategic Defense Initiative Organization (US Army) with Grumman staff.

#### **Equipment Grants and Gifts (\$114,148)**

##### **Iowa State University (\$66,074)**

1. R. Jenison, L. Genalo, K. Kruempel, **G. Sheblé**, "An Updated Computing Environment for Pre-Engineering Students," Major Grants Pool of EFTF, \$109,000 requested, \$95,135 awarded, March 1997, (\$23,784).

2. **Gerald B. Sheblé**, Robin Podmore, Incremental Systems, Inc., "WATTSIM," \$32,000.
3. **Gerald B. Sheblé**, Neural Ware, Inc., "Artificial Neural Network Controllers for Power Electronics," selected, \$5,890. Software: \$4,400. Seminars.

#### **Auburn University (\$48,074)**

1. **Gerald B. Sheblé**, Jet Propulsion Laboratory - electric power system simulator, \$5,600 (permanent loan) at Auburn.
2. **Gerald B. Sheblé**, Harris Corporation - Remote Terminal Unit, \$42,474 at Auburn.

### **VIII. TECHNICAL PUBLICATIONS**

(Dr. **Gerald B. Sheblé** is the principal author on all publications marked with an asterisk. For all other publications, he has made a major contribution.)

*Microsoft Academic Index*

Publications: 129 | Citations: 1707

Fields: Economics & Business, Medicine, Finance

Collaborated with 103 co-authors from 1987 to 2011 | Cited by 2273 authors *Web*

*of Science Index:*

Results found: 103

Sum of Times Cited without self-citations 1819

Citing Articles without self-citations 1469

Average Citations per Item 18.14

Average citations per year: 58.4

*Google Scholar Citation indices*

Citations 4938 h-

index 30 i10-index

63

#### **Referred Journals**

(Page count is shown in parentheses. These papers were reviewed in their entirety for publication in an international journal. "EIC" indicates that the abstract is available from the Engineering Compendex.)

#### **In Preparation**

Available upon request.

#### **Submitted - not yet accepted**

1. "GENCO Decision Analysis using PLP for Step Priced Offers," Feng Gao, Cory Hedman, Gerald Sheblé,
2. "GENCOs Decision-Making Constrained by Operational and Financial Requirements," Gerald B. Sheblé and G. Gutiérrez-Alcaraz
3. "DSM Economic Marginal Demand Bidding," Mei Cheong, Gerald B. Sheblé



4. “Electricity market simulation with knowledge on marginal unit in the system,” Mei Cheong, Gerald B. Sheblé.

#### Accepted, Published or In Press (64 accepted, total pages 536)

1. Gerald B. Sheblé, “Demand is Very Elastic,” IEEE Power & Energy Magazine - IEEE POWER ENERGY MAG , vol. 9, no. 2, 2011, pp. 14-20 (7)
2. F. Gao, Gerald B. Sheblé, “Electricity market equilibrium model with resource constraint and transmission congestion,” Electric Power Systems Research, Volume 80, Issue 1, 2010, pages 9-18 (10).
3. G. Gutiérrez-Alcaraz and Gerald B. Sheblé}, “Generation companies decision-making modeling by linear control theory,” Electric Power Systems Research, Volume 80, I 7, 2010, pages 815-827 (13).
4. G. Gutiérrez-Alcaraz, Gerald B. Sheblé, “The Role of Information for GENCOs Decisionmaking in the Electricity Market,” in press, Electric Power Research Journal (6).
5. M-P Cheong, G Sheblé, “Electricity market simulation with knowledge on marginal unit in the system,” in press, Electric Power Research Journal (6).
6. G. Gutiérrez-Alcaraz, Gerald B. Sheblé, “Sequential time-step generation companies decisions in oligopolistic electricity market,” Electric Power Research Journal, Vol 76, p 695 (6).
7. G. Gutiérrez-Alcaraz and G. B. Sheblé, “Modeling energy market dynamics using discrete event system simulation,” Energy, Volume 34, Issue 10, 2009, pages 1467-1476 (10).
8. Chin-Chuen Teoh, Gerald B. Sheblé, “Integration of Pump Storage Hydro with Wind Energy,” IJETP, 2008 (7).
9. G. B. Sheblé, “Smart grid millionaire,” IEEE Power & Energy Magazine, Volume 6, Issue 1, 2008, pages 22-28 (7).
10. Daniel Berleant, L. Andrieu, Jean-philippe Argaud, F. Barjon, Mei-peng Cheong, Mathieu Dancre, Gerald B. Sheblé and C.-C. Teoh, “Portfolio management under epistemic uncertainty using stochastic dominance and information-gap theory,” International Journal of Approximate Reasoning, special issue on Imprecise Probabilities in Finance and Economics, Volume 49, Issue 1, 2008, pages 101-116 (16).
11. Gutierrez-Alcaraz, G., Sheblé, Gerald B., “Electric market dynamics: Oligopolistic competition,” Electric Power Systems Research, v 76, n 9-10, June, 2006, p 695-700
12. Wang Yu, Gerald B. Sheblé, “Modeling Electricity Markets With Hidden Markov Model,” Electric Power Systems Research, v 76, n 6-7, April, 2006, p 445-451 (7)
13. Wang Yu, Gerald B. Sheblé, Joao A. Pecas Lopes, Manuel Antonio Matos, “Valuation Of Switchable Tariff For Wind Energy,” Electric Power Systems Research, v 76, n 5, March, 2006, p 382-388 (7)
14. D. Berleant, M.-P. Cheong, C. Chu, Y. Guan, A. Kamal, G. Sheblé, S. Ferson, and J.F. Peters, “Dependable Handling of Uncertainty,” Invited Paper, Reliable Computing vol. 9, no. 6, pp. 407-418, 2003.
15. Wang Yu and **Gerald B. Sheblé**, Manuel Anthio Matos, “Application of Markov Chain Models for Short Term Generation Assets Valuation,” PMAPS paper, selected for journal publication, Probability in the Engineering and Informational Sciences (PEIS) (Sheldon Ross, editor), Volume 20, Issue 1, 2006, (6).

16. Cheng HZ, Zhu HF, Crow ML, **Sheblé G. B.**, “Flexible method for power network planning using the unascertained number,” *Electric Power Systems Research*, V68, n1, JAN 2004, p. 41-46 (6).
17. **Gerald B. Sheblé**, Kah-Hoe Ng, “Economic Lessons from the Market Evolution of Present US Power Markets,” IEE Invited Journal Paper, IEE Proceedings, Volume 148, Issue 2, March 2001, Pages 185 – 188, invited (4).
18. **G. B. Sheblé**, “A profit-based unit commitment GA for the competitive environment,” *IEEE Transactions on Power Systems*, Volume 15, Issue 2, 2000, pages 715-721 (7).
19. Somgiat Dekrajangpetch, **Gerald B. Sheblé**, “Structures and Formulations for Electric Power Auctions,” *Electric Power Systems Research*, v54, n3, 2000, Elsevier Sequoia SA, Lausanne, Switzerland, p 159-167. (9)
20. Somgiat Dekrajangpetch, **Gerald B. Sheblé**, “Interior Point Linear Programming Algorithm for Auction Methods,” *IEEE Transactions on Power Systems*, v15, n2, May, 2000, IEEE, Piscataway, NJ, USA, p 572-578. (7)
21. Richter, C. W., and **G. B. Sheblé**, “Profit Based Unit Commitment GA for the Competitive Environment,” presented at the 1999 IEEE Winter Power Meeting, and published *IEEE Transactions on Power Systems*, v15, n2, May, 2000, IEEE, Piscataway, NJ, USA, p 715-721. Abstract published *IEEE Power Engineering Review*, v20, n5, 2000, IEEE, Piscataway, NJ, USA, p 80.
22. Dekrajangpetch, Somgiat and **G. B. Sheblé**, “Bidding Information To Generate Bidding Strategies For LaGrangian Relaxation-Based Auctions,” *Electric Power Systems Research*, v52, n1, 1999, Elsevier Sequoia SA, Lausanne, Switzerland, p 87-96. (10)
23. Dekrajangpetch, Somgiat and **G. B. Sheblé**, “Auction Implementation: Comparison of Auction Methods Using Simplex, Interior Point, and LaGrangian Relaxation,” for presentation and for publication at the 1999 IEEE Winter Power Meeting, pp. 1-6. (6)
24. **Sheblé, G. B.**, “Decision Analysis Tools for GENCO Dispatchers,” presented at the 1998 IEEE PES Summer Power Meeting, San Diego, California, 1998, and published *IEEE Transactions on Power Systems*, v 14, n 2, 1999, IEEE, Piscataway, NJ, USA, p 745-750. (7)
25. Charles W. Richter, Jr., **Gerald B. Sheblé**, and Daniel Ashlock. *Comprehensive Bidding Strategies with Genetic Programming/Finite State Automata*,” Vol 14, N 4, pp 1207 – 1212, PE-030-PWRS-0-10-1998, *IEEE Transactions on Power Systems*, Nov, 1999 (6)
26. Richter, C. W., **G. B. Sheblé\***, and Dan Ashlock, “Developing Utility Bidding Strategies with Genetic Programming/Finite State Automata,” accepted for presentation and for publication at the 1998 IEEE Winter Power Meeting, pp. 1-6. (6)
27. Dekrajangpetch, Somgiat, **G. B. Sheblé\***, A. Conejo, “Auction Implementation Problems Using LaGrangian Relaxation,” presented at the 1998 IEEE Summer Power Meeting, and published *IEEE Transactions on Power Systems*, v 14, n 1, Feb, 1999, IEEE, Piscataway, NJ, USA, p 82-88. (7)
28. Richter, C. W., Jr., and **G. B. Sheblé\***, “Genetic Algorithm Evolution of Utility Bidding Strategies for the Competitive Environment,” submitted for presentation and for publication at the 1997 IEEE Summer Power Meeting, PE-752-PWRS-1-05-1997, *IEEE Transactions on Power Systems*, Vol. 13, No. 1, pp. 256-261, February 1998. (6) EIC
29. Kumar, J., and **G. B. Sheblé\***, “Auction Market Simulator for Price Based Operation,” presented at the 1997 IEEE Summer Power Meeting, *IEEE Transactions on Power Systems*, v 13, n 1, Feb, 1998, IEEE, Piscataway, NJ, USA, p 250-255. (6) EIC

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Available upon request.

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1. D. Berleant, L. Andrieu, J.-P. Argaud, F. Barjon, M.-P. Cheong\*, M. Dancre, **G. Sheblé**, and C.-C. Teoh\*, "Portfolio Management Under Epistemic Uncertainty Using Stochastic Dominance and Information-Gap Theory," The 3rd International Workshop on Reliable Engineering Computing, Feb. 20–22, Savannah, Georgia, 2008.
2. Cheong, M.-P.; **Sheblé, G. B.**; Berleant, D.; Teoh, C.-C.; Argaud, J.-P.; Dancre, M.; Andrieu, L.; Barjon, F.; "Second Order Stochastic Dominance Portfolio Optimization for an Electric Energy Company," Power Tech, IEEE Lausanne, 2007, Pages 819 – 824 (6)

3. Feng Gao; Gutierrez-Alcaraz, G.; **Sheblé, G. B.**, "Comparison of Artificial Life Techniques for Market Simulation," System Sciences, 2006. HICSS '06. Proceedings of the 39th Annual Hawaii International Conference on , vol.10, no. pp. 243a- 243a, 04-07 Jan. 2006
4. M.-P. Cheong, **G. Sheblé**, D. Berleant, "Knowledge Extraction and Data Mining for the Competitive Electricity Auction Market," 9th International Conference on Probability Methods Applied to Power Systems, Stockholm, Sweden, June 11-15, 2006.
5. Feng Gao, **Gerald B Sheblé**, "Stochastic Optimization Techniques For Economic Dispatch With Combined Cycle Units," Session 2, Program for the 9th International Conference on Probabilistic Methods Applied to Power Systems June 11-15, 2006, Stockholm, Sweden, pages 8.
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10. Feng Gao, Guillermo Gutierrez, **Gerald B Sheblé**, "Comparison of Artificial Life Techniques for Market Simulation"; 39th Hawaii International Conference on System Sciences, January 4-7, 2006, 6 pages.
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12. H. Moreno, G. Gutiérrez, S. Plumel, **Gerald B. Sheblé**, "A New Approach to Assess the Value of Reactive Power Production," published and presented at *15th Power Systems Computation Conference (PSCC 2005)*, Liège, Belgium, August 2005.
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  63. **Sheblé, Gerald B.**, "Distribution Energy Management System - Experiments with Generic Software," IEEE Computer Applications in Power Magazine, vol. 4, no. 3, pp. 27-31, July 1991. Invited article. (6) EIC
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#### **Non-Refereed Proceeding Articles (Abstract Reviewed)**

(Page count is shown in parentheses. These papers were reviewed by extended abstract for publication in conference proceedings.)

**Submitted, Not Yet Accepted** Available upon request.

#### **Accepted, Published or In Press (49, total pages 294)**

1. M.-P. Cheong, G. B. Sheblé, and D. Berleant, "Business intelligence using information gap decision theory and data mining approach in competitive bidding," report, EPRC/PAR 41st Annual Meeting, 2004.
2. M.-P. Cheong, **G. Sheblé**, and D. Berleant, "Information Gap Based Decision Theory for Data Mining of Competitive Bidding," IEEE Power Engineering Society 2004 General Meeting, Denver, Colorado, June 6–10, 2004.
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17. **Sheblé, Gerald B.**, "Basic Risk Management Toolbox," Frontiers in Power Conference, Stillwater, Oklahoma, invited paper, November 1997. (5)
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32. Davidson, J. L., **G. Sheblé**, and K. Sun, "Mapping Knowledge Based System to a Neural Network for Power System Security," presented at the 1994 Midwest Electro-Technology Conference and published in the Proceedings, pp. 35-38, Ames, IA, April 8-9, 1994. (4)
33. Maifeld, T. T., S. F. Coppinger, and **Gerald B. Sheblé\***, "Successive Approximation Dynamic Programming for Economic Dispatch," presented at the 1994 Midwest Electro-Technology Conference and published in the Proceedings, pp. 109-113, Ames, IA, April 8-9, 1994. (5)
34. Kumar, Jayant, and **Gerald B. Sheblé\***, "Artificial Neural Network for EDC Pool Dispatch," *Proceedings of the 56<sup>th</sup> Annual American Power Conference*, Part 1 (of 2), April 25-27, 1994, vol. 56, no. Part 1, Chicago, IL, April 1994. (6) EIC
35. **Sheblé, Gerald B.**, "Simulation of Discrete Auction Systems for Power System Risk Management," *Proceedings – 27<sup>th</sup> Annual Frontiers of Power Conference*, Stillwater, Oklahoma, October 24-25, 1994, I-1-I-9. (6) EIC
36. **Sheblé, Gerald B.**, "Electric Energy in a Fully Evolved Marketplace," accepted North American Power Symposium, Kansas State University, KS, 1994. (6)

37. Maifeld, Timothy, and **Gerald B. Sheblé\***, "Evolution of a Unit Commitment Schedule Using a Genetic Algorithm," accepted North American Power Symposium, Kansas State University, KS, 1994. (5)
38. Kumar, Jayant, and **Gerald B. Sheblé\***, "A Framework for Transaction Selection Using Decision Analysis Based Upon Risk and Cost of Insurance," accepted North American Power Symposium, Kansas State University, KS, 1994. (6)
39. Welsh, D. E., and **Gerald B. Sheblé\***, "Review of Artificial Neural Networks Applications to Short-Term Power System Load Forecasting," presented and published in the *Proceedings* of the 24th North American Power Symposium, Reno, Nevada, October 1992. (5)
40. Kumar, Jayant, and **Gerald B. Sheblé\***, "Correcting the Generation Dispatch to Relieve Overloads on Transmission Lines using Neural Networks," presented at the 1992 Midwest Electro-Technology Conference and published in the *Proceedings*, pp. 31-34, Ames, IA, April 8-9, 1992. (5)
41. Albanna, Zaid, and **Gerald B. Sheblé\***, "Optimal Capacitor Placement Via Genetic Algorithms," First Midwest Electro-Technology Conference, pp. 14-17, Ames, IA, April 10-11, 1992. (4)
42. Newton, Steven R., R. M. Nelms, L. L. Grigsby, and **Gerald B. Sheblé**, "A Modular State Variable Approach to the Electromagnetic Transients Program," *Proceedings* of the 21<sup>st</sup> Southeastern Symposium on System Theory, pp. 118-122, Tallahassee, Florida, March 1989. (5)
43. Williamson, Susan, and **Gerald B. Sheblé\***, "Simulation, Estimation, Analysis and Control of Spacecraft Power Systems," *Proceedings* of the 21<sup>st</sup> Southeastern Symposium on System Theory, pp. 114-117, Tallahassee, Florida, March 1989. (4)
44. Williamson, Frank, and **Gerald B. Sheblé\***, "Single Phase Harmonic Analysis of Spacecraft Power Systems Using a Personal Computer," *Proceedings* of the 21<sup>st</sup> Southeastern Symposium on System Theory, pp. 110-113, Tallahassee, Florida, March 1989. (4)
45. Glasscock, T. C., L. L. Grigsby, R. M. Nelms, and **G. B. Sheblé**, "Unbalanced Power Flow on the IBM PC/AT for Spacecraft Power System Analysis," *Proceedings* of the Twentieth Southeastern Symposium on System Theory (SSST), pp. 263-267, North Carolina, March 1988. (5)
46. Newton, S. R., B. B. Reid, **G. B. Sheblé**, R. M. Nelms, and L. L. Grigsby, "Electromagnetic Transients Simulator for Large-scale Spacecraft Power Systems," *Proceedings* of the Twentieth Southeastern Symposium on System Theory (SSST), pp. 141-144, Charlotte, North Carolina, March 1988. (4)
47. Emesih, V. A., **G. B. Sheblé\***, and L. L. Grigsby, "Observability Analysis and State Estimation on a Personal Computer," presented and published as part of the *Proceedings* of the Twentieth Southeastern Symposium on System Theory (SSST), pp. 254-258, Charlotte, North Carolina, March 1988. (5)
48. **Sheblé, G. B.\***, and L. L. Grigsby, "Power System Training Simulator for Power System Analysis," *Proceedings* of the Nineteenth Southeastern Symposium on System Theory, pp. 345-349, Clemson, South Carolina, March 1987. (5)
49. Burlinson, J., M. Nelms, L. Grigsby, and **G. Sheblé**, "Power Flow and Transient Stability Analysis on a Personal Computer," *Proceedings* of the Nineteenth Southeastern Symposium on System Theory, pp. 66-70, Clemson, South Carolina, March 1987. (5)

IEEE Power Engineering Magazine, Business Scene Column: (counted as journal by Microsoft evaluation).

1. **Sheblé, G. B.**, "Off the Grid, Last One Off Pays Stranded Costs," Power and Energy Magazine, IEEE, Volume: 10, Issue: 4, 2012, pages 14 - 20
2. **Sheblé, G. B.**, "Demand Is Very Elastic!," Power and Energy Magazine, IEEE, Volume: 9, Issue: 2, 2011, pp 14 - 20
3. **Sheblé, G. B.**, Forward to the past [The Business Scene]; *PAE-M July-Aug 2009*, 16, 18-18, 20, 25
4. **Sheblé, G. B.**, Blowing in the wind! [In My View]; *PAE-M Jan-Feb 2009* 88-86
5. **Sheblé, G. B.**, What about U.S.? [in my view], Power and Energy Magazine, IEEE Volume: 6, Issue: 4, 2008, pp 80 – 78.
6. **Sheblé, G. B.**, Smart grid millionaire, Power and Energy Magazine, IEEE, Volume: 6 , Issue: 1, 2008, pp 22 – 28
7. **Sheblé, G. B.**, "Engineering economics: the latest oxymoron?" Power and Energy Magazine, IEEE, vol.4, no.4, pp. 14- 16, July-Aug. 2006
8. **Sheblé, G. B.**, "The business scene - Disputing deregulation is industrial disorganization on the rise?" Power and Energy Magazine, IEEE , vol.4, no.1, pp. 16- 22, Jan.-Feb. 2006 (2)
9. **Sheblé, G. B.**, "Valuation of services. Competitive industry modeling," Power and Energy Magazine, IEEE, Volume: 1, Issue: 2, 2003, pp. 14 - 19
10. **Sheblé, G. B.**, "Energy service providers," Power and Energy Magazine, IEEE, Volume: 1 , Issue: 6, 2003, pp 12 - 15

## Books

### Under development

1. **Sheblé, G. B.**, "Energy System Planning, Economic Perspectives for a Real Option Analysis," submitted, expected publication December 2017. Based on material developed at Iowa State University, Portland State University, and University of Porto/MIT Sustainable Energy Doctoral Program
2. **Sheblé, G. B.**, "Numerical Methods for Real Option Analysis for Renewable Energy Systems," expected publication January 2017, Developed by funding from PSERC and NSF projects. Based on material developed at Iowa State University, Portland State University, and University of Porto/MIT Sustainable Energy Doctoral Program
3. **Sheblé, G. B.**, "Stray Current Basics, Problems, and Solutions," expected publication January 2017.
4. **Sheblé, G. B.**, "Reactive Power Basics, Problems, and Solutions," expected publication February 2017.

**Published**

1. Wood, A., Bruce Wollenberg, **Gerald B. Sheblé**, "Power System Generation, Operation and Control," 3<sup>rd</sup> edition, Wiley, November 1, 2013. Based on material developed at Iowa State University, University of Minnesota, Portland State University, and University of Porto/MIT Sustainable Energy Doctoral Program.
2. **Sheblé, G. B.**, (Editor), "Reactive Power: Basics, Problems and Solutions," Publisher IEEE 87 Eh0262-6-Pwr, July 1987, Paperback **ISBN: 9997279646**.
3. **Sheblé, G. B.**, (Editor), "Application of Optimization Methods for Economy/Security Functions in Power System Operations," Chapter 1: **G. B. Sheblé**, "Optimization Overview with Economic Dispatch Examples," Presented at the 1991 Power Engineering Society Winter and Summer Meeting, published as course text 90EH0328-5-PWR, (90 pages, *Reviewed by IEEE Press.*)
4. **Sheblé, G. B.**, "Computational Auction Methods for Restructured Power System Industry Operation," Kluwer Academic Press, published March 1999, December 2001, 2nd printing (340 pages).

**Chapters of Books**

1. Chapter 11, "Information Technology Application," **Gerald B Sheblé**, Kit Po Wong, Dr. Loi Lei Lai, Power System Restructuring and Deregulation: Trading, Performance and Information Technology, Edited by Loi Lei Lai, John Wiley, ISBN 047149500x, October, 2001, March 2002, 2nd printing (65 pages)
2. Charles W. Richter, Jr. and **Gerald B. Sheblé**, "Building and Evaluating GENCO Bidding Strategies and Unit Commitment Schedules with Genetic Algorithms," book on Unit Commitment edited by Benjamin Hobbs, Kluwer Academic Publishers: Boston, MA, July 2001. (45 pages)
3. Chapter 6: **G. B. Sheblé**, "Agent Based Economics," M. Ilic, F. Galiana, L. Fink, "Power System Restructuring: Engineering and Economics," Text Editors, Kluwer, 1998 (56 pages).

**Advisory Board Membership**

1. **Sheblé, G. B.**, Electric Power Research Journal, 2006 – present.
2. **Sheblé, G. B.**, "The Electric Power Engineering Handbook," CRC Press, Inc., Editor: L. Grigsby, Auburn University, Member of Advisory Board, 1993 - 2015.

**Other Scholarly Works****Reference Text (Reviewed by Editorial Board)****Under development**

Available upon request.

**Published**

1. **G. B. Sheblé**, "Economics of Bulk Electric Power Supply, Chapter 12, Standard Handbook for Electrical Engineers, 2012. Updated material for Standard Handbook of Electrical Engineering Section on Economics, Wayne Beaty editor, McGraw Hill, submitted December, 2006.
2. **G. B. Sheblé**, Updated material for Power System Planning Section of Electric Power Engineering Handbook 2nd Edition, Leo Grigsby editor, Taylor and Francis Publisher, submitted December 2012.
3. **Sheblé, G. B.**, "SECTION 19: ELECTRIC ENERGY ECONOMIC METHODS," H. Wayne Beaty (editor), Handbook of Electric Power Calculations, Second Edition, McGraw Hill, 2012.
4. **G. B. Sheblé**, "Introductory Power Flow Analysis," Electrical Engineering Encyclopedia, Wayne Beaty editor, McGraw Hill, submitted December, 2006.
5. **G. B. Sheblé**, "Economics of Bulk Electric Power Supply, Chapter 12, Standard Handbook for Electrical Engineers, 2005. Updated material for Standard Handbook of Electrical Engineering Section on Economics, Wayne Beaty editor, McGraw Hill, submitted December, 2006.
6. **G. B. Sheblé**, Updated material for Power System Planning Section of Electric Power Engineering Handbook 2nd Edition, Leo Grigsby editor, Taylor and Francis Publisher, submitted December 2006.
7. **Sheblé, G. B.**, "SECTION 19: ELECTRIC ENERGY ECONOMIC METHODS," H. Wayne Beaty (editor), Handbook of Electric Power Calculations, Second Edition, McGraw Hill, 2000.
8. **Sheblé, G. B.**, Power System Planning (Reliability) Section Editor, "Planning," The Electric Power Engineering Handbook, Leonard L. Grigsby (Editor), CRC Press, 2000, (46 pages).
9. **Sheblé, G. B.**, "Electric Energy Economics." Handbook of Electric Equations, edited by W. Beaty, 2000.
10. **Sheblé, G. B.**, with J. Kumar, "Power Flow," Wiley's Encyclopedia of Electrical and Electronics Engineering edited by John G. Webster, pages 1-44.
11. Lamont, J. W., with **G. B. Sheblé**, "Economics of Bulk Electric Power Supply, Chapter 12, Standard Handbook for Electrical Engineers, 1998.
12. Lamont, J. W., with **G. B. Sheblé**, "Economics of Bulk Electric Power Supply, Chapter 12, Standard Handbook for Electrical Engineers, 1993.

**Short Course Texts (7)**

*(Reviewed by Reliability Conference Subcommittee)*

1. McCalley, J., and **G. B. Sheblé**, "Competitive Electric Energy Systems: Engineering Issues in the Great Experiment," a tutorial paper presented at the Fourth International Conference of Probabilistic Methods Applied to Power Systems, 1994.
2. McCalley, J., and **G. B. Sheblé**, "Competitive Electric Energy Systems: Reliability of Bulk Transmission and Supply," a tutorial paper presented at the Fourth International Conference of Probabilistic Methods Applied to Power Systems, 1994.

*(Reviewed by IEEE PES System Economics Subcommittee)*

3. **Sheblé, G. B.**, "Comparison of Optimization Techniques and Auctions Mechanisms," invited tutorial seminar by H. Singh, IEEE PES 1998 Summer Power Meeting, San Diego, California, 1998. (Not yet presented.)
4. **Sheblé, G. B.**, "Optimization Overview with Economic Dispatch Examples," Presented at the 1991 Power Engineering Society Winter and Summer Meetings published as course text 90EH0328-5-PWR, Application of Optimization Methods for Economy/Security Functions in Power System Operations (course organizer).

*(Reviewed by IEEE PES System Control Subcommittee)*

5. **Sheblé, G. B.\***, and Suri Vemuri, "Review of 1982 Voltage/Var Survey," 1987 IEEE PES Summer Meeting, San Francisco, California, and the 1988 IEEE PES Winter Meeting, New York, New York, and published in Course Text 87EHO262-6-PWR, Reactive Power: Basics, Problems and Solutions.
6. **Sheblé, G. B.\***, and J. Raine, "Power System Concepts of Reactive Power," 1987 IEEE PES Summer Meeting, San Francisco, CA, and the 1988 IEEE PES Winter Meeting, New York, New York, and published in Course Text 87EHO262-6-PWR, Reactive Power: Basics, Problems and Solutions.
7. **Sheblé, G. B.**, (Editor), "Reactive Power: Basics, Problems and Solutions," Publisher IEEE 87 Eh0262-6-Pwr, July 1987, subsequently published as a paperback **ISBN: 9997279646**.

### **Power Learn On-Line Modules (6)**

*(Reviewed by Power Learn Committee)*

1. **G. B. Sheblé**, "Economic Dispatch Algorithms for Operation Optimization," PowerLearn Module, Web-Based Power Systems Educational Tools and Materials, August 1995.
2. **G. B. Sheblé**, "Distribution Analysis using Two-Port Network Theory," PowerLearn Module, Web-Based Power Systems Educational Tools and Materials, August 1995.
3. **G. B. Sheblé**, "Operation and Optimization, and Harmonic Analysis," PowerLearn Module, Web-Based Power Systems Educational Tools and Materials, August 1995.
4. **G. B. Sheblé**, G. Gutierrez, M.-P. Cheong, "Electricity Market Organization and Operation," PowerLearn Module, Web-Based Power Systems Educational Tools and Materials, July 2004 (30 pages).
5. **G. B. Sheblé**, C.C. Teoh, M.-P. Cheong, "Financial Risk Assessment for Marketing Decisions and Strategies," PowerLearn Module, Web-Based Power Systems Educational Tools and Materials, July 2004 (16 pages).
6. **G. B. Sheblé**, W. Yu, M.-P. Cheong, "Market Based Congestion Management," PowerLearn Module, Web-Based Power Systems Educational Tools and Materials, July 2004 (24 pages).

### **Selected Reports (15)**

(Most reports are for the Electric Power Research Center, the Electric Power Research Institute, or the funding companies.)

1. Gerald Sheblé, Kory Hedman, Gerald Heydt, Jonathan Stahlhut, Peter Sauer, Becky Westendorf, "Uncertain Power Flows & Transmission Expansion Planning (M-10)," PSERC Workshop, Report on Funded project to Industrial Advisory Board, 2006.



2. Feng Gao and Gerald Sheblé, "Artificial Life Techniques For Economic Dispatch With Combined Cycle Units", report, EPRC/PAR 42nd Annual Report, June, 2005.
3. M.-P. Cheong, G. B. Sheblé, and D. Berleant, "Business intelligence using information gap decision theory and data mining approach in competitive bidding," report, EPRC/PAR 41st Annual Meeting, 2004 (11 pages).
4. G. B. Sheblé (Project leader), D. Berleant, M.-P. Cheong, J.Z. Zhang, "Interval Analysis for Unknown Dependencies and Genetic Algorithm Emulation of Markets," Market Interactions and Market Power final report, Power Systems Engineering Center Publication 03-33, Feb. 2004 (113 pages).
5. Wang Yu and Gerald B. Sheblé, Electric Power Research Center Annual Affiliate Report, 2001, 2002, 2003.
6. G. B. Sheblé (Project leader), D. Berleant, M.-P. Cheong, J.Z. Zhang, "Interval Analysis for Unknown Dependencies and Genetic Algorithm Emulation of Markets," Market Interactions and Market Power final report, Power Systems Engineering Center Publication 03-33, Feb. 2004 (113 pages).
7. **G. Sheblé**, D. Berleant, J. Zhang, M. Cheong, and R. Thomas, "Market Interaction and Market Power" (III), Power Systems Engineering Research Center, Industrial Activities Board meeting, Atlanta, Georgia, Dec. 12, 2002.
8. **Sheblé, G. B.**, Joao Pecos Lopes, "Transforming Regulated Industry Standards into Deregulated Market Rules for Security and Reliability," European Union Regulatory Commission (EERSE), October 2002.
9. **Sheblé, G. B.**, Joao Pecos Lopes, "Generation Resource Standards Revised," report to Portuguese Chief Regulator, November 2002.
10. Michael E. Pati, Ralph Ristau, **Gerald B. Sheblé**, Martin C. Wilhelm, "Real Option Valuation of Distributed Generation," EEI Invited White Paper. January 2001.
11. G. Sheblé, 'Price Determination of Electricity in a Competitive Environment, Reaching Profitable Electricity Customers with Market Power,' EPRI Report TR-114709, January 2000.
12. G. Sheblé, 'Price Impact of Transmission Capacity Using FACTS Devices,' EPRI Report TR-114710, January 2000.
13. Felak, Richard, Andrew T. Poray, **Gerald B. Sheblé**, Peter K. Wong, "Glossary of Terms and Definitions Concerning Electric Power Transmission System Access and Wheeling," IEEE Publication 96 TP 110-0, IEEE Power Engineering Society, 1996.
14. Fahd, George, Douglas Post, and **Gerald Sheblé**, "Wheeling Costing Methodology," Electric Power Research Center, December 1993.
15. G.B. Sheblé. "AC Load Flow Studies with DC Transmission Links." TR-EE-74-4; PCTR-474, January 1974. Purdue Electric Power Center, School of Electrical Engineering, Purdue University, West Lafayette, Indiana 47907

### **Book Reviews**

1. **Sheblé, G. B.**, Power systems (review of "Robust Power System Frequency Control" by Bevrani, H.; 2009) [Book reviews]; IEEE Power & Energy Magazine - IEEE POWER ENERGY MAG , vol. 7, no. 5, pp. 77, 79-80, 2009
2. **Sheblé, G. B.**, Power system economics: designing markets for electricity [Book Review] Power and Energy Magazine, IEEE, 02/2003; 1(1):58- 63.

## **Journal Paper Discussions**

1. **Sheblé, Gerald**, discussed paper, "Load Frequency Control Issues in Power System Operations After Deregulation," by R. D. Christie and Anjan Bose, 1995.
2. **Sheblé, Gerald B.**, discussed paper with J. McCalley, "Marginal Pricing and Supplement Cost Allocation in Transmission Open Access," by H. Rudnick, R. Palma and J. E. Fernandez, 1995.
3. Fahd, G., and **G. B. Sheblé**, discussed paper, "Daily Generation Scheduling Optimization with Transmission Constraints: A New Class of Algorithms," by J. Batut and A. Renaud. Accepted for publication in the IEEE Transactions on Power Systems, August 1992.
4. Vemuri, Suri, and **Gerald B. Sheblé**, discussed paper 86SM305-7, "Adaptive Weather-Sensitive Short Term Load Forecast," by R. Campo and P. Ruiz.
5. Fahd, G., and **G. B. Sheblé**, discussed Paper 90 WM 011-7, "Further Developments in LP-Based Optimal Power Flow," O. Alsoc, J. Bright, M. Prais, B. Stott.

## **IX. RECENT TECHNICAL PRESENTATIONS**

### **Conference Presentations**

(Presentations on panels at international conference. Normally presented to groups of professional engineers in industry.)

1. **Gerald B. Sheblé**, "Power System Career Evolution," TENCON Keynote Invited Presentation, Sydney, Australia, April, 2013.
2. **Gerald B. Sheblé**, "Valuation of Demand Side Management and Interruptible Demand," Iowa Association of Municipal Utilities, Des Moines, Iowa, Feb 19, 2004
3. **Sheblé, Gerald B.**, "Markets, the Value Chain and Market Reach," Porto Power Tech, September, 2001.
4. **Sheblé, Gerald B.**, "Risk Management Overview," presented and published at Probability Methods Applied to Power Systems Conference, Madeira, Portugal (PMAPS), September 2000.
5. **Sheblé, G. B.**, "Power Marketing Functions," presented at the 1998 IEEE Summer Power Meeting, Wednesday panel session, invited by Dr. S. Vemuri, San Diego, California, 1998.
6. Dekrajangpetch, Somgiat, and **G. B. Sheblé**, "Bidding Strategies for LaGrangian Relaxation Based Power Auctions," presented at the 1989 IEEE Summer Power Meeting, Thursday panel session, invited by Dr. H. Singh, San Diego, California, 1998.
7. **Sheblé, G. B.**, "Decision Analysis Tools for Dispatchers," presented at the 1997 IEEE PES Summer Power Meeting, Wednesday panel, invited by Dispatcher Training Working Group Chair, Berlin, Germany, 1997.

### **Seminar Presentations**

(Presentations are given in a short format of one to two hours duration. Seminars presented to groups of graduate students or professional engineers in industry as part of a graduate or undergraduate curriculum.)

**Presented (86)**

1. **Gerald B. Sheblé**, "Phasor Measurement Unit Based Functions from Estimation to Blackstart," AERI invitation, TEB, August, 2012.
2. **Gerald B. Sheblé**, "It is an Economic System!," invited lecture to summarize workshop and to lead panel, Modeling and Forecasting in Liberalized Electricity Markets, May 15<sup>th</sup> - 16<sup>th</sup>, 2008, Faculdade de Economia do Porto - Room EPG 631.
3. **Gerald B. Sheblé**, "Energy System Courses to Provide Skills for Future Engineers," PGE Seminar, USA, Beaverton, Oregon, 2008
4. **Gerald B. Sheblé**, "Smart Grid Project Planning for an Intelligent Grid between Suppliers and Consumers," Northwest Energy Association, Portland, Oregon, 2008.
5. **Gerald B. Sheblé**, "Energy System Evolution Implies Skills Needed for Future Engineers," IEEE USA, Seminar, Portland, Oregon, 2008.
6. **Gerald B. Sheblé**, "Economic Tradeoff Decisions between Energy Resources," Portland City Club, November, 2007.
7. **Gerald B. Sheblé**, "Optimization Decomposition and Adaptive Agent Processes," University of Arkansas Little Rock, College of Engineering, invited lecture, March 2007.
8. **Gerald B. Sheblé**, "Emerging Technologies for Scarce Electric Energy," Portland State University Electrical Engineering Department, July 28, 2005.
9. **Gerald B. Sheblé**, "Energy Markets: Information Technology, Systems and Software Engineering," University of Missouri at Rolla, April 14, 2005.
10. **Gerald B. Sheblé**, "Energy Markets: Information Technology, Systems Engineering and Software Engineering," Clarkson University Electrical Engineering Department, April 7, 2005.
11. **Gerald B. Sheblé**, "Decision Support System for Market Makers," Iowa State University Electrical and Computer Engineering Department, Power System Seminar Series, February 15, 2005.
12. **Gerald B. Sheblé**, "Modeling Electric Market Dynamics and Generation Company Decisions with DESS," University of Illinois, Electrical and Computer Engineering Department, Grainger Power System Seminar Series, March 8, 2004.
13. **Gerald B. Sheblé**, "Short-term Electric Market Dynamics and Generation Company Decision Making in New Deregulated Environment," Illinois Institute of Technology, Grainger Power System Seminar Series, Feb 13, 2004
14. **Gerald B. Sheblé**, "Power System Bidding based on Uncertain Intervals," invited talk to the EDF Financial Engineering Research Group, Clamart, France, June 19, 2003.
15. **Gerald B. Sheblé**, "Power System Economics at Iowa State University," invited talk to the IEEE Spanish Regional Committee at Ciudad Real, Spain, November 13, 2002.
16. **Gerald B. Sheblé**, "Market failures due to Externalities," invited by Antonio Conejo, University of LaMancha-Castille, Ciudad Real, Spain, IEEE Chapter Meeting, November 12, 2002.
17. **Gerald B. Sheblé**, "Financial Instruments for Energy Trade - Regulatory Issues," Post graduation course on Law of Regulation (Faculty of Law), University of Coimbra, Coimbra, Portugal, October 19, 2002. Invited presentation by Jorge Vasconcelles, Chief Portuguese Regulator, and Chief Regulator European Union.
18. **Gerald B. Sheblé**, "Market failure simulation and mitigation," invited by Joao Pecas Lopes, University of Porto, IEEE Chapter Meeting, Porto, Portugal, October 12, 2002.

19. **Gerald Sheblé**, "Market failures due to structure and to external economic forces," NSF/EPRI Workshop, Economics, Electric Power and Adaptive Systems, Co-Sponsored by The Electrical and Communications Systems (ECS) Division of NSF, Program Director, James Momoh, and The Electric Power Research Institute (EPRI), Area Manager, Infrastructure Security and Lead, Mathematics and Information Science, Massoud Amin, Arlington Virginia, March 28-29, 2002. Invited paper by Bruce Wollenberg.
20. ISU, Department of Industrial and Manufacturing Systems Engineering (IMSE), As Director of Complex Adaptive Systems, "Market Congestion Relief or Price Biasing?" February 17, 2000.
21. **Sheblé, Gerald B.**, "Economic Impact of Restructured Power Industry," ETH University, Zurich, Switzerland, March 1999.
22. **Sheblé, Gerald B.**, "Evolution of International Power Exchanges," ISU EP&ES Seminar, Dec. 7, 1999.
23. **Sheblé, Gerald B.**, "Agent Based Modeling of Electric Auctions," Los Alamos National Labs, Los Alamos, NM, February 1999.
24. **Sheblé, Gerald B.**, "Economic Impact of Restructured Power Industry," ETH University, Zurich, Switzerland, March 1999.
25. **Sheblé, Gerald B.**, "Economic Impacts of Planning in a Changing Industry Environment," NSF Workshop, invited paper, Champaign-Urbana, Illinois, June 1997.
26. **Sheblé, Gerald**, "Success Stories in Research at Iowa State Universities and Summary of Available Workshops," Mid-America, Des Moines, IA, July 8, 1997.
27. **Gerald Sheblé**, "Utility of ATC for Markets," NSF Workshop on ATC, University of Illinois, Urbana, IL, June 28-30, 1997.
28. **Gerald B. Sheblé**, "Economic Impacts of Planning in a Changing Industry Environment," NSF Workshop, invited paper, Champaign-Urbana, IL, June 1997.
29. **Sheblé, Gerald B.**, "Auction Mechanism Gaming," session chair H. Singh, IEEE PES Summer Power Meeting, San Diego, California, July, 1998.
30. **Sheblé, Gerald**, "National Grid Company Operational Requirements for a Deregulated U.K.," Power Group, ISU, Ames, Iowa, January 13, 1998.
31. **Sheblé, Gerald**, "Alternative Implementations of Electric Power Auctions," Power Group, University of Washington, C. C. Liu, Seattle, Washington, March 2, 1998.
32. **Sheblé, Gerald**, "Dispatching Tools for Dispatchers," presented at 1997 IEEE PES Summer Power Meeting, Transmission Operations Subcommittee, invited paper, Berlin, Germany, July 1997.
33. **Sheblé, Gerald**, "Load Forecasting Applications," graduate seminar, University of Wisconsin, F. Alvarado, Madison, Wisconsin, November 1997.
34. **Sheblé, Gerald**, "Electricity as a Commodity," EPRC presentation to Illinois Power Company, Decatur, Illinois, August 21, 1997.
35. **Sheblé, Gerald**, "Financial and Economic Concepts for Pricing Transmission Services," CENTREL Roundtable Forum, invited presentation by S. Virmani of Electrotek, sponsored by USAID, Warsaw, Poland, September 16, 1997.
36. **Sheblé, Gerald**, "Transmission Service Markets-Structures and Principles," CENTREL Roundtable Forum, invited presentation by S. Virmani of Electrotek, sponsored by USAID, Warsaw, Poland, September 16, 1997.
37. **Sheblé, Gerald**, "Success Stories in Power Research," EPRC presentation to Illinois Power Company, Decatur, Illinois, August 21, 1997.

38. **Sheblé, Gerald**, "Electricity as a Commodity," EPRC presentation to Iowa Electric Company, Cedar Rapids, Iowa, November 20, 1997.
39. **Sheblé, Gerald**, "Success Stories in Power Research," EPRC presentation to Iowa Electric Company, Cedar Rapids, Iowa, November 20, 1997.
40. **Sheblé, Gerald**, "Electricity as a Commodity," EPRC presentation to Mid-America, Des Moines, Iowa, July 8, 1997.
41. **Sheblé, Gerald**, "Success Stories in Power Research," EPRC presentation to Mid-America, Des Moines, Iowa, July 8, 1997.
42. **Sheblé, Gerald**, "Electricity as a Commodity," EPRC presentation to Commonwealth Edison, Chicago, Illinois, September 26, 1997.
43. **Sheblé, Gerald**, "Success Stories in Power Research," EPRC presentation to Commonwealth Edison, Chicago, Illinois, September 26, 1997.
44. **Sheblé, Gerald**, EPRI Load Forecasting Group, "Fuzzy Logic Application of Electric Prices," invited tutorial presentation, Power Marketing Association Conference, Washington, DC, November 1997.
45. **Sheblé, Gerald**, EPRI Load Forecasting Group, "Forecasting Applications," invited presentation, Washington, DC, Power Marketing Association Conference, November 1997.
46. **Sheblé, Gerald**, EPRI Power Delivery Group, "Auction Market Simulation Laboratory," invited white paper, Grid Operations & Planning Business Unit Council, Phoenix, Arizona, October 1997.
47. **Sheblé, Gerald**, "Artificial Life Solutions in Power Systems, Economics, and Health Care," presentation to Proctor & Gamble, ISU Workshop, invited by D. Ashlock, Ames, Iowa, November 1997.
48. **Sheblé, Gerald**, "Utility of ATC for Auction Markets," NSF Workshop on ATC, University of Illinois, Urbana, Illinois, June 28-30, 1997.
49. **Sheblé, Gerald**, "Auction Markets for Electric Energy Services," graduate course in power system Economics, T. Gedra, Oklahoma State University, Stillwater, Oklahoma, October 24, 1997.
50. **Sheblé, Gerald B.**, "De-Regulation Panel Session," session chair T. Gedra, IEEE PES Winter Power Meeting, New York, New York, January 1997.
51. **Sheblé, Gerald B.**, "Basics of Commodity Markets," University of Missouri, Rolla, Missouri, graduate seminar, December 12, 1996.
52. **Sheblé, Gerald B.**, "Economic Impacts of Operations in a Changing Industry Environment," Mega-NOPR Task Force Presentation of ISU Training Simulator, IEEE Summer Power Meeting, Denver, Colorado, 1995.
53. **Sheblé, Gerald B.**, "Economic Impacts of Planning in a Changing Industry Environment," NSF Workshop, invited paper, Champaign-Urbana, Illinois, June 1997.
54. **Sheblé, Gerald B.**, "Genetic Algorithm Development on a Health Care Expert System," Punk, Ziegel and Knoell Health Care Conference, Top 50 CEOs of the Health Care Industry, New York, New York, November 16, 1995. Invited presentation.
55. **Sheblé, Gerald B.**, "Economic Analysis for Electrical Engineers," NSF Workshop, Innovative Power Engineering Education in a Changing Industry Environment, June 1995. Invited paper.
56. **Sheblé, Gerald B.**, "Price Based Operation in an Auction Market Structure," University of Illinois Power Group, 1995.
57. **Sheblé, Gerald B.**, "Interchange Access Management," ISU Power Group, Ames, Iowa, October 4, 1994.

58. **Sheblé, Gerald B.**, "Price Based Operation in an Auction Market Structure," Power Group, ISU, Ames, Iowa, October 24, 1995.
59. **Sheblé, Gerald B.**, "Price Based Operation in an Auction Market Structure," Auburn University Power Group, Auburn, Alabama, October 29, 1995.
60. **Sheblé, Gerald B.**, "Electricity as a Commodity," IEEE Chicago Chapter, Chicago, Illinois, May 17, 1995.
61. **Sheblé, Gerald B.**, EPRC/Power Affiliate Research Program, Ames, Iowa, May 1995.
62. **Sheblé, Gerald B.**, and Silvia S. F. Coppinger, "Transaction Selection Using Decision Analysis," EPRC/Power Affiliate Research Program, Ames, Iowa, May 1995.
63. Kumar, J., and **Gerald B. Sheblé**, "Auction of Electric Power Interchange," EPRC/Power Affiliates Research Program, Ames, Iowa, May 1995.
64. **Sheblé, Gerald B.**, and Tim Maifeld, "Developing an Export System by Using a Genetic Algorithm," EPRC/Power Affiliate Research Program, Ames, Iowa, May 1995.
65. Kumar, J., and **G. Sheblé**, "Application of Artificial Neural Network to Power System Optimization Problems," Electric Power Research Center Affiliates Meeting, Ames, Iowa, 1994.
66. Post, D., and **G. B. Sheblé**, "Electric Power Interchange Transaction Analysis and Selection," Electric Power Research Center Affiliates Meeting, Ames, Iowa, 1994.
67. Wudali, R., J. Lamont, and **G. B. Sheblé**, "Decision Analysis for Distribution Automation," Electric Power Research Center Affiliates Meeting, Ames, Iowa, 1994.
68. **Sheblé, G. B.**, "Evolution of Strategies for Multiagent Environment," Artificial Life Seminar Series, Iowa State University, Heady Hall, November 12, 1993.
69. **Sheblé, G. B.**, "Genetic Algorithms and Artificial Neural Networks," Electric Power Research Center Advisory Committee meeting, ISU Durham Center, October 19, 1993.
70. **Sheblé, G. B.**, "Genetic Algorithms as Optimizers for Nonlinear Programming and Integer Programming Problems," presented by Ph.D. student Tim Maifeld, Artificial Life Seminar Series, Iowa State University, Heady Hall, October 15, 1993.
71. **Sheblé, G. B.**, "Reregulation of the Electric Power Industry," Illinois Institute of Technology, A Montgomery Ward Auditorium, October 15, 1993.
72. **Sheblé, G. B.**, "Economic Operation and Optimization (Update on Scheduling and Optimization Research at ISU), co-presentation with J. Lamont, Power Systems Seminar, Department of Electrical Engineering and Computer Engineering, Iowa State University, October 5, 1993.
73. **Sheblé, G. B.**, "Unit Commitment by Genetic Algorithm," Undergraduate Summer Intern Poster Presentation presented by Silvia Fukurozaki-Coppinger, ISU Memorial Union Sun Room, Program for Women in Science and Engineering, Iowa State University, August 6, 1993.
74. **Sheblé, G. B.**, "Integration and Dispatching of Renewable Energy Sources," American Power Dispatchers Association Spring meeting, Cedar Rapids, Iowa, April 16, 1993.
75. **Sheblé, G. B.**, "Issues in Optimization," Power Systems Seminar, Department of Electrical Engineering and Computer Engineering, Iowa State University, February 16, 1993.
76. **Sheblé, G. B.**, "Activities in Bulk Power Transfer Analysis," ISU/Power Systems Seminar, September 1992.
77. **Sheblé, G. B.**, "Genetic Algorithms for Power System Optimization," Flight Dynamics, Optimization, and Control Seminar Series, Department of Aerospace Engineering and Engineering Mechanics, Iowa State University, October 29, 1991.

78. **Sheblé, G. B.**, National Science Foundation Workshop on the Impact of a Less Regulated Utility Environment on Power System Control and Security, April 19-20, 1991, University of Wisconsin, Madison, Wisconsin. Invited Panel Speaker, Topic: "Brokerage Exchange for Power Contracts," pp. 47-50.
79. **Sheblé, G. B.**, NASA Workshop - Neural Networks, February 1991, Auburn University, Auburn, Alabama. Topic: "Overview of Artificial Neural Network Methodology Problems in Power System Engineering," published in conference proceedings, presented by F. Williamson (graduate student).
80. **Sheblé, G. B.**, "Genetic Algorithms for Optimization," Iowa State University/Power Systems Seminar, November 1990. Georgia Power Company, Control Center Staff, October 1990.
81. **Sheblé, G. B.**, "Evaluation of Open Access Impacts," Commonwealth Edison, August 1994.
82. **Sheblé, G. B.**, "Bid Evaluation of Energy Management System Proposals," July 1990. Conducting seminars on advanced techniques in power systems analysis to specification, design review and testing of scheduling software. Review the state-of-the-art for energy management systems and recommend the priority for research in each area.
83. **G. B. Sheblé**, "Organization of Distribution and Transmission Operations," August, 1990. Conducting Seminars on advanced techniques in power systems analysis to specification, design review and testing of scheduling software. Review the state-of-the-art for energy management systems and recommend the priority for research in each area.
84. **G. B. Sheblé**, "Unit Commitment Solution Methods," Central and South West Services, Inc., September, 1989. Conducting Seminars on advanced techniques in power systems analysis to specification, design review and testing of scheduling software. Review the state-of-the-art for energy management systems and recommend the priority for research in each area.
85. **G. B. Sheblé**, "Graphics User Interface Optimized for Human Interaction in a Control Center," Harris Corporation (Controls and Composition Division), August 1989.
86. **G. B. Sheblé**, "Life Cycle Costing and Bid Evaluation for Vendor Selection," Control Data Corporation (Energy Management Systems Division): EMPROS, August 1988.

## WEBINARS

McIlvaine Company Hot Topic Hour on "Wind Option for Utility Renewable Mandates" on Thursday April 8-9, 2010. Presentation Title: "Storage scheduling impact on financial justification of wind generation."

Abstract: "The uncertainty of wind generation is not clearly understood at this time. The generation output is a function of wind energy at a given instant of time. The variability can be rather large and thus leads to a requirement of other generation, storage or demand response to maintain system balance. It is the combination of resources that determines the total value of wind generation."

## News Interviews (8)

1. National Public Radio/BBC, broadcast of Portland City Club Presentation across the USA and the UK, 2007.
2. Dubuque News Radio, Electric Power Deregulation in Iowa, 2001.
3. John Shors, Des Moines Business Register, 1997.

4. Matt Kelley, Radio Iowa, as heard on KASI, February 17, 1998.
5. Ross Little and Bruce Sawhill, Ernst & Young, LLP, "Market Feedback Replaces Regulation: Adaptation in the Electric Power Industry," February 1998.
6. Peter Downs, "Multilevel Marketing of Electricity," SPARK Magazine, April 1998.
7. Bill Peterson, *The Comment Program*, calling talk show KUEX, Moberly, Missouri, April 2, 1998.
8. Michell Mihalovich, "Choosing an Electric Company," ISU News Service, University Relations, January 1998.

## X. EXTENSION/OUTREACH ACTIVITIES

### Short Courses developed through Quanta Technology, LLC

1. Phasor Measurement Applications including State Estimation, Contingency Analysis, Voltage Stability Margin Predictor, Remedial Action, and Security Constrained Dispatch. Developed observability analysis of synchrophasor measurements for state estimation, subsynchronous resonance detection, contingency analysis and remedial action such as security constrained dispatch.
2. System planning procedures for renewable resources such as distributed generation and storage using real option analysis.

### Short Courses delivered through Iowa State University (11)

1. **G. Sheblé**, "Handling Uncertainty in a Changing Utility Environment," Power System Operations Short Course, Ames, Iowa, April 1997.
2. **G. Sheblé**, "Auction Market Simulators," Power System Operations Short Course, Ames, Iowa, April 1997.
3. **Gerald B. Sheblé**, Professional Engineering Exam Refresher Course, "Engineering Economics," November 1996.
4. **Gerald B. Sheblé**, Professional Engineering Exam Refresher Course, "Decision Analysis," November 1996.
5. **Gerald B. Sheblé**, "Electric Energy in a Fully Evolved Marketplace," Power System Operators Short Course, Ames, IA, April 26, 1996.
6. **Gerald B. Sheblé**, "Auction Market Emulation," Power System Operators Short Course, Ames, IA, April 26, 1996.
7. **Gerald B. Sheblé**, "The Impact on System Control Strategy in a Competitive Utility Environment Communications: Power Plant to Substation," Power Industry Computer Applications Conference, short course, Salt Lake City, UT, May 1995.
8. **Gerald B. Sheblé**, "Electric Energy in a Fully Evolved Marketplace," Power System Operators Short Course, Ames, IA, April 24, 1995.
9. **Gerald B. Sheblé**, "Auction Market Emulation," Power System Operators Short Course, Ames, IA, April 24, 1995.
10. Tom Wind and **Gerald B. Sheblé**, "Engineering Economics in a Changing Utility Environment," short course, Ames, IA, November 14-17, 1995.



11. **Gerald B. Sheblé**, Economic Dispatch and Scheduling (Optimization), Power System Operators Short Course, Iowa State University, Holiday Inn Gateway Center, Ames, IA, April 18, 1991.

#### Short Courses delivered through Auburn University (4)

1. **Gerald B. Sheblé**, Modern Power Systems Analysis - Power System Operation Session and System Planning Session, (40 students), annual short course at Auburn, 1990.
2. **Gerald B. Sheblé**, Modern Power Systems Analysis - Power System Operation Session and System Planning Session, (40 students), annual short course at Auburn. Ranked as fifth best instructor among thirteen professors from southeast during short course, 1989.
3. **Gerald B. Sheblé**, Modern Power Systems Analysis - Power System Operation Session, (40 students), annual short course at Auburn, 1988.
4. **Gerald B. Sheblé**, Modern Power Systems Analysis - Power System Operation Session, (40 students), annual short course at Auburn, 1987.

#### Short Courses delivered through Professional Organizations (IEEE, IEE, etc.) (14)

1. **Sheblé, Gerald B.**, "Introduction to Electricity Markets," Electricity Markets Tutorial, Porto Power Tech, Porto, Portugal, 2001.
2. **Sheblé, Gerald B.**, "Auctions Including Availability and Expected Energy Served," Electricity Markets Tutorial, Porto Power Tech, Porto, Portugal, 2001.
3. **Sheblé, Gerald B.**, "Alternative Implementations of Electric Power Auctions," Electricity Markets Tutorial, Porto Power Tech, Porto, Portugal, 2001.
4. **Sheblé, Gerald B.**, "Applications of Market Power and Market Reach," Electricity Markets Tutorial, Porto Power Tech, Porto, Portugal, 2001.
5. **Sheblé, Gerald B.**, "Applications of Auction Results to Power System Expansion," Electricity Markets Tutorial, Porto Power Tech, Porto, Portugal, 2001.
6. **Sheblé, Gerald B.**, "Financial Engineering, Market Risk and Reliability Evaluation," Electricity Markets - Models and Tools for Utilities and Other Players, EES-UETP Course, Porto, Portugal, May 2000.
7. **Sheblé, Gerald B.**, "Auction-Dispatch Systems and Strategic Bidding," Electricity Markets - Models and Tools for Utilities and Other Players, EES-UETP Course, Porto, Portugal, May 2000.
8. **Sheblé, Gerald B.**, "Valuation of Electric Contracts in a Deregulated Environment," IEE Short Course, Belfield, Dublin, Ireland, May 1999.
9. **Sheblé, Gerald B.**, Short Course presented at the Winter Power Meeting IEEE PES, Gaming Theory and Power System Markets, "Gaming Strategies for LaGrangian Relaxation Auctions (Unit Commitment)," New York, New York, 1999.
10. **Sheblé, Gerald B.**, Short Course presented at the Power Industry Computer Applications Conference, The Impact on System Control Strategy in a Competitive Utility Environment, "Pricing of Inadvertent Interchange," Columbus, Ohio, 1997.
11. **Sheblé, Gerald B.**, "Distribution Management: Profit-based Load Management for Deregulated Market," Kah-Hoe Ng, EPRC/Power Affiliate Research Program, May 1996.
12. **Sheblé, Gerald B.**, "Automatic Generation Control with a Fuzzy Logic Controller," Charles Richter, Jr., EPRC/Power Affiliate Research Program, May 1996.

13. **Sheblé, Gerald B.**, "Simulation of Electric Power Market using Genetic Algorithm based Adaptive Agents," Project Report Summary, EPRI Genetic Algorithms Tutorial, January 24, 1997.
14. **Sheblé, Gerald B.**, Iowa State University Power Group, "Risk Assessment and Risk Management," January 18, 1997.

Short Courses delivered through Other Organizations (DSI Inc., University of Illinois, INESCFEUP, etc.) (39)

1. **Sheblé, Gerald B.**, Engineering Economic Decisions, INESC, 14 module course on real option analysis delivered to Electricite do Portugal, Spring 2003.
2. **Sheblé, Gerald B.**, Market Modeling and Operational Issues, Electric Energy Systems - University Enterprise Training Partnership (EEE-UETP), FEUP Workshop on "Integration of Renewable and CHP, Guarantee of Supply and Ancillary Services in Electricity Markets", invited instructor for lecture "Market Modeling and Operational Issues," workshop held at INESC's offices, Campus da FEUP, Porto, Portugal, INESC Porto, Campus da FEUP, Rua Dr. Roberto Frias n° 378, 4200 - 465 Porto – Portugal, November 26-29, 2002.
3. **Sheblé, Gerald B.**, Market Modeling and Operational Issues, Electric Energy Systems - University Enterprise Training Partnership (EEE-UETP), FEUP Workshop on "Integration of Renewable and CHP, Guarantee of Supply and Ancillary Services in Electricity Markets", invited instructor for lecture "Portfolio Modeling and Real Option Asset Management," workshop held at INESC's offices, Campus da FEUP, Porto, Portugal, INESC Porto, Campus da FEUP, Rua Dr. Roberto Frias n° 378, 4200 - 465 Porto – Portugal, November 26-29, 2002.
4. **Sheblé, Gerald B.**, Market Modeling and Operational Issues, Electric Energy Systems - University Enterprise Training Partnership (EEE-UETP), FEUP Workshop on "Integration of Renewable and CHP, Guarantee of Supply and Ancillary Services in Electricity Markets", invited instructor for lecture "Overview of Ancillary Services," workshop held at INESC's offices, Campus da FEUP, Porto, Portugal, INESC Porto, Campus da FEUP, Rua Dr. Roberto Frias n° 378, 4200 - 465 Porto – Portugal, November 26-29, 2002.
5. **Sheblé, Gerald B.**, Market Modeling and Operational Issues, Electric Energy Systems - University Enterprise Training Partnership (EEE-UETP), FEUP Workshop on "Integration of Renewable and CHP, Guarantee of Supply and Ancillary Services in Electricity Markets", invited instructor for lecture "Integration of Renewables and CHP," workshop held at INESC's offices, Campus da FEUP, Porto, Portugal, INESC Porto, Campus da FEUP, Rua Dr. Roberto Frias n° 378, 4200 - 465 Porto – Portugal, November 26-29, 2002.
6. **Sheblé, Gerald B.**, Portfolio Modeling and Real Option Asset Management, Electric Energy Systems - University Enterprise Training Partnership (EEE-UETP), Integration of renewables and CHP, guarantee of supply and ancillary services in electricity markets, INESC Porto, Campus da FEUP, Rua Dr. Roberto Frias n° 378, 4200 - 465 Porto – Portugal, November 26-29, 2002.
7. **Sheblé, Gerald B.**, Overview of Ancillary Services, Electric Energy Systems - University Enterprise Training Partnership (EEE-UETP), Integration of renewables and CHP, guarantee of supply and ancillary services in electricity markets, INESC Porto, Campus da FEUP, Rua Dr. Roberto Frias n° 378, 4200 - 465 Porto – Portugal, November 26-29, 2002.

8. **Sheblé, Gerald B.**, "Wholesale Market Modeling: Simulation and Game Theoretic Approaches," Transitional Strategies in Electric Utility Restructuring, Budapest, Hungary, October 2001. (Delivered remotely).
9. **Sheblé, Gerald B.**, "Market Price Forecasting in Transition Markets," Transitional Strategies In Electric Utility Restructuring, Budapest, Hungary, October 2001. (Delivered remotely).
10. **Sheblé, Gerald B.**, "Theory and Application of Adaptive Agents," Electricity Market Simulation & Price Forecasting, Budapest, Hungary, October 2001. (Delivered remotely).
11. **Sheblé, Gerald B.**, "Bidding Behavior and Price Volatility," Electricity Market Simulation & Price Forecasting, Budapest, Hungary, October 2001. (Delivered remotely).
12. **Sheblé, Gerald B.**, "Financial Engineering, Market Risk and Reliability Evaluation," Electricity Markets - Models and Tools for Utilities and Other Players, EES-UETP Course, Porto, Portugal, May 2000.
13. **Sheblé, Gerald B.**, "Auction-Dispatch Systems and Strategic Bidding," Electricity Markets - Models and Tools for Utilities and Other Players, EES-UETP Course, Porto, Portugal, May 2000.
14. **Sheblé, Gerald B.**, "Energy Trading Primer Examples And Case Studies," Investment & Trading in Electric Energy Systems in the Restructured Environment, San Francisco, CA, November 15-17, 1999, DSI.
15. **Sheblé, Gerald B.**, "Risk Assessment Tools For Energy Contracts," Investment & Trading in Electric Energy Systems in the Restructured Environment, San Francisco, CA, November 15-17, 1999, DSI.
16. **Sheblé, Gerald B.**, "Methodologies To Model Competition In A Deregulated Market," Investment & Trading in Electric Energy Systems in the Restructured Environment, San Francisco, CA, November 15-17, 1999, DSI.
17. **Sheblé, Gerald B.**, "Methodologies For Risk Management - Financial Perspectives," Investment & Trading in Electric Energy Systems in the Restructured Environment, San Francisco, CA, November 15-17, 1999, DSI.
18. **Sheblé, Gerald B.**, "Energy Trading: Perspective Of The Energy Service Provider," Investment & Trading in Electric Energy Systems in the Restructured Environment, San Francisco, CA, November 15-17, 1999, DSI.
19. **Sheblé, Gerald B.**, "Energy Trading Primer - Examples and Case Studies," University of Canterbury, Christchurch, New Zealand, June 1999.
20. **Sheblé, Gerald B.**, "Energy Trading Primer - Examples and Case Studies Form the USA," Energy Trading and Risk Management Workshop, Miami, Florida March 22-24, 1999.
21. **Sheblé, Gerald B.**, "Methodologies for Assessing Future Uncertainties for Multiple Generation Sources," Market Workshop, Miami, Florida March 22-24, 1999.
22. **Sheblé, Gerald B.**, "Probabilistic Production Costing as an Analysis Tool," Energy Trading and Risk Management Workshop, Miami, Florida March 22-24, 1999.
23. **Sheblé, Gerald B.**, "Decision Analysis Approaches to Risk Assessment," Energy Trading and Risk Management Workshop, Miami, Florida March 22-24, 1999.
24. **Sheblé, Gerald B.**, "Energy Trading: Perspective of the Energy Service Provider," Energy Trading and Risk Management Workshop, Miami, Florida March 22-24, 1999.
25. **Sheblé, Gerald B.**, "Energy Trading Primer - Examples and Case Studies Form the USA," Energy Trading and Risk Management Workshop, Amsterdam, Netherlands, December 3-5, 1998.

26. **Sheblé, Gerald B.**, "Methodologies for Assessing Future Uncertainties for Multiple Generation Sources," Market Workshop, Amsterdam, Netherlands, December 3-5, 1998.
27. **Sheblé, Gerald B.**, "Probabilistic Production Costing as an Analysis Tool," Energy Trading and Risk Management Workshop, Amsterdam, Netherlands, December 3-5, 1998.
28. **Sheblé, Gerald B.**, "Decision Analysis Approaches to Risk Assessment," Energy Trading and Risk Management Workshop, Amsterdam, Netherlands, December 3-5, 1998.
29. **Sheblé, Gerald B.**, "Energy Trading: Perspective of the Energy Service Provider," Energy Trading and Risk Management Workshop, Amsterdam, Netherlands, December 3-5, 1998.
30. **Gerald B. Sheblé**, "Auction Market Basics," University of Illinois short course, invited by EPTIG professors, presented in Houston, Texas, May, 1998.
31. **Gerald B. Sheblé**, "Auction Structures and Bidding Strategies," University of Illinois short course, invited by EPTIG professors, presented in Houston, Texas, May, 1998.
32. **Sheblé, Gerald B.**, "Energy Trading Primer - Examples and Case Studies Form the USA," Energy Trading and Risk Management Workshop, Madrid, Spain, May 26-28, 1998.
33. **Sheblé, Gerald B.**, "Methodologies for Assessing Future Uncertainties for Multiple Generation Sources," Market Workshop, Madrid, Spain, May 26-28, 1998.
34. **Sheblé, Gerald B.**, "Probabilistic Production Costing as an Analysis Tool," Energy Trading and Risk Management Workshop, Madrid, Spain, May 26-28, 1998.
35. **Sheblé, Gerald B.**, "Decision Analysis Approaches to Risk Assessment," Energy Trading and Risk Management Workshop, Madrid, Spain, May 26-28, 1998.
36. **Sheblé, Gerald B.**, "Energy Trading: Perspective of the Energy Service Provider," Energy Trading and Risk Management Workshop, Madrid, Spain, May 26-28, 1998.
37. **Gerald B. Sheblé**, "Auction Market Basics," University of Illinois short course, invited by EPTIG professors, presented in San Francisco, California, December, 1997.
38. **Gerald B. Sheblé**, "Auction Structures and Bidding Strategies," University of Illinois short course, invited by EPTIG professors, presented in San Francisco, California, December, 1997.
39. **Sheblé, G. B.**, "Comparison of Optimization Techniques and Auctions Mechanisms," invited tutorial seminar by H. Singh, IEEE PES 1999 Winter Power Meeting, New York, New York, 1999 (not yet presented).

## **XI. PATENTS**

Patent applied for Health Care Data Mining of protocols as a covered application. Licensed to Pace Healthcare Systems and 3M from 1998 through 2003. Patent application withdrawn upon 3M's request to not disclose methodology.

### **Provisional Patent Applications**

1. Underground earth capacitors, natural and man-made, 2013.
2. Stray Current Mitigation by Active Switching of Demand, 2013
3. Contingency Analysis and Reactive Power Remedial Action (CARPRA), 2013.

**XII. GRADUATE STUDENTS (Chaired - Major Professor)****Masters Degree Theses****Portland State University, Ames, IA**

	Graduation Year	Thesis Title	Student
27	2009	<i>Energy Systems - Finite Element Applications</i>	Parvathy Chittur Ramaswamy
26	2009	<i>Valuation of Renewable/Sustainable Energy Resources</i>	Parvathy Thulaseedharan
25	2008	<i>Auction of Reliability based Contracts</i>	Gregory Bingham

**Iowa State University, Ames, IA**

	Graduation Year	Thesis Title	Student
24	2009	<i>Comparison of Computational Intelligence Methods for Economic Optimization</i>	Umar Butt
26	2007	<i>Real Option Analysis of Equipment Investment</i>	Kory Walter Hedman
23	2004	<i>Data Mining Market Information of Competitor Decision Analysis with Real Options</i>	Mei-Peng Cheong
22	2004	<i>Real Option Toolbox in MATLAB</i>	Chin-Cheun Teoh
21	2003	<i>Exploitation of Market Power Using Financial Transmission Rights</i>	Derek Lane
20	2002	<i>Genetic Algorithm-Based Simulation of Electric Power Markets</i>	David Doty
19	2002	<i>Exploring Computational Electric Power Markets With Evolutionary Algorithms.</i>	Valentin Petrov
18	2002	<i>Forecasting with Hartley Transform</i>	James Nicolaisen
17	2000	<i>Enhancing The Electricity Auction And Power Systems With Power Flow Controller</i>	Hao Wu
16	1997	<i>Probabilistic Production Costing: A Comparison of Four Methods</i>	Mona Bisat
15	1997	<i>Comparison of Linear Programming, LaGrangian Relaxation and Interior Point Methods for Electric Power Auction Markets</i>	S. Dekrajangpetch
14	1997	<i>Demand Side Management for a Competitive Environment</i>	Kah-Hoe Ng

13	1996	<i>Developing Bidding Strategies for an Electric Utility in a Competitive Environment</i>	Chuck Richter [Research Excellence Award Winner]
12	1994	<i>Capacitor Placement and Sizing - A Machine Learning Approach</i>	Ramdev Wudali
11	1994	<i>Augmented LaGrangian Evaluation of Wheeling Transactions</i>	Douglas Post
10	1993	<i>Artificial Neural Networks for Optimization of Power System Operation</i>	Jayant Kumar
9	1993	<i>Harmonic Power Flow Load Modeling</i>	Douglas Welch
8	1992	<i>Application of Optimal Power Flow to Interchange Brokerage Transaction</i>	Darwin Anwar

### Auburn University, Auburn, AL

	Graduation Year	Thesis Title	Student
7	June 1991	<i>Application of Genetic Algorithms to the Economic Dispatch of Power Generation</i>	David Walters
6	August 1989	<i>Harmonic Analysis of Spacecraft Power Systems</i>	Frank Williamson
5	August 1989	<i>Simulation and Analysis of Spacecraft Power Systems</i>	Susan Williamson
4	August 1989	<i>The Implementation of an Energy Brokerage System Using Linear Programming</i>	Dan Richards
3	August 1989	<i>A New Approach to AC/DC Power Flow</i>	Thomas Smed
2	June 1989	<i>Simulation of Adaptive Automatic Generation Control on Multiple Personal Computers</i>	Sanjay Agarwal
1	December 1987	<i>Static State Estimation in Power Systems: Theory and Computer Implementation</i>	Valentine Emesih

**Ph.D. Dissertations****Portland State University, Ames, IA**

	Graduation Year		Dissertation Title	Student
13	2009		<i>Energy Expansion Planning using Real Option Valuation Methods</i>	Chin-Chuen Teoh

**Iowa State University, Ames, IA**

	Graduation Year	Dissertation Title	Student
12	TBD Research in absentia	<i>Game Theory Applied to Adaptive Agents in Multiple Markets</i>	Mei-Ping Cheong No Professor of Record
11	2009	<i>Multiple Market Information Needs for Successful Decision Analysis with Real Options</i>	Guillermo Gutiérrez Alcaraz Professor of Record Arun Somani
10	TBD Research in absentia	<i>Probabilistic Production Costing for Planning</i>	Mona Bisat
9	2007	<i>Simulation of Adaptive Agents for Market Simulation</i>	Feng Gao
8	2005	<i>GENCO Real Option Analysis of Market Signals</i>	Wang Yu
7	2003	<i>Short-Term Electric Market Dynamics And Generation Company Decision-Making In New Deregulated Environment</i>	Weiguo Yang
6	December 2000	<i>Operation Planning for an Energy Service Company</i>	Kah-Hoe Ng
5	December 1999	<i>Auction Development For The Price-Based Electric Power Industry</i>	Somgiat Dekrajangpetch [Research Excellence Award Winner]
4	December 1998	<i>Developing Bidding Strategies for an Electric Utility in a Competitive Environment</i>	Chuck Richter
3	December 1996	<i>Electric Power Auction Market Simulator</i>	Jayant Kumar
2	December 1994	<i>Genetic Based Unit Commitment Algorithm</i>	Tim Maifeld [Research Excellence Award Winner]

**Auburn University, Auburn, AL**

	Graduation Year	Dissertation Title	Student
1	June 1991	<i>Optimal Power Flow Emulation of Interchange Brokerage Systems Using Linear Programming</i>	George Fahd

**External Reviewer**

	Student	Degree	Chair	University/Location
14	Yusuf Yiliyasi	PhD.	Daniel Berleant	University of Arkansas Little Rock
13	Luis Costa	PhD.	George Kariniotakis	Ecole nationale supérieure des Mines de Paris ( <i>ENSMP</i> )
12	Leonel de Magalhães Carvalho	MS	Vladimiro Miranda	Faculdade de Engenharia da Universidade do Porto (FEUP)
11	Magalhães Carvalho	MS	Vladimiro Miranda	Faculdade de Engenharia da Universidade do Porto (FEUP)
10	Jose Manuel Monteiro de sa Couto	MS	Helder Filipa Duarte Leite	Faculdade de Engenharia da Universidade do Porto (FEUP)
9	Ricardo Manuel Vils Boas de Azevedo	MS	Helder Filipa Duarte Leite	Faculdade de Engenharia da Universidade do Porto (FEUP)
8	Jing Liu	PhD.	Lalit Goel	Nanyang Technical University, Singapore, China
7	Bei Jing	PhD.	Lalit Goel	Nanyang Technical University, Singapore, China
6	Jarurote Tippayachai	Ph. D. 2007	Weerakorn Ongsakul	Asian Institute of Technology Klong Luang, Pathumthani, Thailand
5	Dejan Paravan	Ph. D. 2004	Robert Golob	University of Ljubljana, Slovenia
4	Philip Talacek	Ph. D. December 2002	Neville Watson	University of Canterbury Christchurch, New Zealand
3	Marcelino Madrigal	Ph. D. December 2000	Victor Quintana	University of Waterloo Waterloo, Canada
2	Meadhbh Flynn	Ph.D. April 1999	Mark O'Malley	University of Dublin Dublin, Ireland



1	Qiu Bin	M. S. September 1998	Gooi Hoay Beng	Nanyang Technological University Singapore
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### Visiting Scholars

	Student Funding Agency	Degree	Chair	University/Location
5	Jarurote Tippayachai (Thailand National Foundation)	Ph. D. September 2003 – February 2004	Weerakorn Ongsakul	Asian Institute of Technology Klong Luang, Pathumthani, Thailand
4	Dejan Paravan (Slovenia National Foundation)	Ph. D. October 2003 – March 2004	Robert Golob	University of Ljubljana, Slovenia
3	Guillermo Gutiérrez Alcaraz (Mexican National Foundation)	Ph. D. August 1999 - 2009	Arun Somani	Iowa State University
2	Antonio Conejo	Professor	Gerald Sheblé	University of Castilla - La Mancha
1	Thomas Smed (Fulbright)	M. S. August 1988- 1989	Gerald Sheblé	Auburn University Auburn, AL, USA

### Member of Graduate Student Committee

#### *Iowa State University*

Student	Degree	Year	Major Professor (Chair)
15 Badri Ramanathan	Ph. D. E. E.	December 2004	V. Vittal
14 Jianzhong Zhang	M.S.CPr.E.	December 2003	D. Berleant
13 Haibo You	Ph. D. E. E.	December 2003	V. Vittal
12 Ana Margarida Quelhas	M.S. E. E.	December 2002	J. D. McCalley
11 Sundar Rajan	Ph.D. E. E.	September 1998	J. W. Lamont
10 Emmanouil Obessis	Ph.D. E. E.	June 1998	J. W. Lamont
9 Gilsoo Jang	Ph.D. E. E.	May 1997	V. Vittal
8 A. Irizarry-Rivera	Ph.D. E. E.	July 1996	J. D. McCalley

7	Anujit Basu	Ph.D. E. E.	February 1995	Eric Bartlett
6	Kim Keehoon	Ph.D. ME	December 1994	Eric Bartlett
5	Sudipto Ghosh	M.S.C.S.	December 1994	Al Baker
4	Tim Ernst	M.S. E. E.	August 1993	J. W. Lamont
3	Ralph Folkers	M.S. E. E.	May 1993	J. W. Lamont
2	Sundar Rajan	M.S. E. E.	December 1992	J. W. Lamont
1	Emmanouil Obessis	M.S. E. E.	December 1992	J. W. Lamont

### XIII. PROFESSIONAL ACTIVITIES

#### A. Membership

1. Institute of Electrical and Electronics Engineers (IEEE) (Senior Member since 1985, Fellow since 1996, Distinguished Lecturer 2003)
  - a. Power Engineering Society, Fellow
    - i. Power System Engineering Committee
    - ii. Task Force Transmission Access
    - iii. Computer and Analytic Methods Subcommittee
    - iv. Neural Network Applications Task Force
    - v. System Control Subcommittee
    - vi. Power System Control Center Working Group
    - vii. Operating Economics Working Group
  - b. Industrial Applications Society (1986 – 2002)
  - c. Automatic Control Society (1986 – 2002)
  - d. Circuits & Systems Society (1986 – 2002)
  - e. Neural Networks Council
  - f. Representative to IEEE-USA Energy Policy Committee (1995 – 2003, 2005-present)
2. American Association of University Professors (1986 – PRESENT)
3. Congrès Internationale des Grands Réseaux Electriques (CIGRE) (1986 – present)
4. Decision Analysis Institute (DAS) (2000 – Present)
5. Global Association of Risk Professionals (GARP) (1996 – present)
6. International Association of Financial Engineers (IAFE) (1996 – present)
7. International Association for Energy Economics (IAEE) (1998 – present)
8. Institute for Operations Research and Management Science (INFORMS) (1999 – present)
9. New York Academy of Sciences (1991 – 2003)
10. PRMIA (1998 – Present)

#### B. Participation

##### American Power Conference

University Representative, 1996 - 2002

Program Planning Meeting, IIT, Chicago, Illinois, September 25, 1997

##### CERTS

Participated in response to FERC SMD as requested by US DOE, 2002 – 2005

**CIGRE**

Pricing Methods for Electric Markets, 2001-2002.  
 Transmission Access Task Force, 1995 - 1998.  
 Transmission Costing Task Force, 1995 - 1997.

**DOE**

DOE Workshop, "Real-Time Control and Operation of Electric Power Systems," Denver, CO, November 1991.  
 CERTS, August 2002 through 2007

**EPRI**

EPRI Symposium, EPRI Load Forecasting Group, Denver, Colorado, Short Term Load Forecasting Conference, April 1999  
 EPRI Symposium, EPRI Load Forecasting Group, Washington, DC, Power Marketing Association Conference, November 1997  
 EPRI Power Delivery Group, Grid Operations & Planning Business Unit Council, Phoenix, Arizona, October 1997  
 EPRI Symposium, "Bulk Power Marketing Decisions Under Uncertainty," Chicago, IL, August 1992.  
 EPRI Symposium, "Eight Electric Utility Forecasting Symposium," Baltimore, MD, October 1991.

**Electric Machines and Power Systems Journal (EMPSJ)**

Member of Editorial Board, January 1996- 2000

Papers reviewed by year:	1998	10
	1997	10
	1996	2

**Institute of Electrical and Electronics Engineers (IEEE)**

Power Engineering Society Energy Magazine Associate Editor, 2005 - present.  
 1999 - 2000 Chair Awards Committee for IEEE PES.  
 1998 Summer Power Meeting: Session Chair: System Economics, July 16, 1998. 1996 Summer Power Meeting: Committee work: Transmission Costing, Operating Economics, Operator Training, System Planning.  
 Organized and presented tutorial on Optimization at Winter Power Meeting 1991 and Summer Power Meeting 1991.  
 Attended IEEE Power System Engineering Committee 1990 Triennial Meeting, November 12-14, 1990, Auburn University, Auburn, Alabama.  
 System Economics Subcommittee, Operating Economics Working Group, (Chairperson since 1987), Conducted Winter Power Meeting and Summer Power Meeting Sessions: 1987, 88, 89, 90, 91, 92.  
 Organization Committee Co-Chairman, 22nd Annual North American Power Symposium, October 15-16, 1990, Auburn University.

Outside evaluation of Computer Society Periodicals (1992-1993): *Transactions on Pattern Analysis and Machine Intelligence*, *Transaction on Knowledge and Data Engineering*, *Software Magazine*.

**IEE Sixth International Conference on Advances in Power System Control, Operation and Maintenance**

International Advisory Committee Member, APSCOM 2003, IEE Sixth International Conference on Advances in Power System Control, Operation and Maintenance, Professor Kit Po Wong, General Chair, APSCOM 2003

**International Journal of Innovations in Energy Systems and Power (IJESP)**

Advisory Board, 2006 – present.

**North American Power Symposium**

Chair, Energy Markets I, Chair: **G. Sheblé**, 35th North American Power Symposium, University of Missouri-Rolla, October 20-21, 2003

**National Science Foundation (NSF)**

Summary Discussion: "Control and Security as Viewed by Engineers and Economists," by A. A. Fouad and **G. B. Sheblé**, pp. 192-197. Published in workshop proceedings, National Science Foundation, Engineering Systems/Power Systems Program, Washington D.C. 20550

Invited presentation to Power System Security and Power System Research Needs Workshop, Chaired Optimization by Neural Networks session at NSF Workshop at Clemson University (invitation only), 1990.

**Power Tech (IEEE)**

International Advisory Committee Member, Bologna, Italy, 2003.

International Advisory Committee Member, Porto, Portugal, 2001.

**Probability Methods Applied to Power systems (PMAPS)**

Paper review committee, PMAPS 2004, J. McCalley Chair, Ames, Iowa.

Chaired Session, PMAPS 2004, Ames, Iowa.

Chair Session: LEM I - New Challenges for Liberalized Energy Markets I, at PMAPS 2002, invited by Guido Carpinelli & Alfredo Testa, Conference Co-Chairmen, Naples, Italy, October 2002.

**Power System Computational Conference**

Paper review committee since 1995

**Scientific Journals International (SJI)**

Editorial Review Board, Environmental, 2005 – present.

**U.S. Civilian Research and Development Foundation**

Proposal reviews

**Other**

Texas A & M University, Reference letter requested for Dr. Karen Watson (Tenure and Promotion). Dr. Watson was promoted and tenured.

Tenure review of Tim Haskew, University of Alabama, September 1996

Technical Program Subcommittee, Applications of Neural Networks to Power Systems, Yokohama, Japan, April, 1993.

Missouri Valley Electric Association (invitation), 1992

Sargent & Lundy - Engineering Conference (invitation), 1992.

**Paper and Proposal Reviews**

**Papers reviewed for IEEE Journals:**

Approximately 54 papers per year since 1987.

**Papers reviewed for other journals:**

**Association**

Science Journal

Science/Physics Journal

Operations Research

Physica D

IEE

ISCAS

Applications of Neural Networks to Power Systems

Transactions on Neural Networks

International Journal of Energy Systems

Aerospace and Electronic Systems

Electric Power Systems Research Journal

International Association of Energy Economists – (IAEE)

Annals of Operations Research – (INFORMS)

Iranian Journal

**Conferences**

North American Power Symposium (NAPS)

Probability Methods Applied to Power Systems (PMAPS)

Power Tech

Power Systems Computations Conference

**NSF Proposals Reviewed:**

Research, small business, and lab equipment proposals since 1986.

**Consulting to Companies (38)**

Listed under projects in an above section.

**XIV. UNIVERSITY ACTIVITIES****Portland State University****University Service**

Faculty Senate Member, 2007 - 2009

**Department Committees**

Promotion and Tenure	Chair, 2006-2007
	Member, 2007 - 2009
Graduate Committee	Chair, 2006 fall

**Iowa State University****Faculty**

2002, July Hosted Professor Tom Gedra as Big XII fellowship

**Student Activities**

2001-2002	Faculty Advisor, ISU Ballroom Dance Club
1999-2002	Faculty Advisor, ISU Sailing Club

**Graduate College**

1999-2001 Director, Complex Adaptive Systems Program

**College of Engineering**

2003 – 2005	Member of Committee for Cooperative and Intern Program
2000-2002	Engineering Computer Services & Policy Task Group
1999-2000	Chair, Mathematics Liaison Committee, College of Engineering
1999-2005	Systems Engineering Committee Member, College of Engineering
1997-1998	Mentor for Dr. T. Van Voorhis (IMSE)
1993-1995	Member TQM Committee

**Department Committees**

2005 – 2005	Chair, Electric Power and Energy Systems
2003 - 2005	Mentor for Dr. Daniel Berleant
2003 – 2005	Chair for Cooperative and Intern Program
2000 - 2002	Chair, Electric Power and Energy Systems

2003 - 2005	Faculty Search Committee
2000 - 2005	Member of Promotion and Tenure Committee
1998(Spring) - 2000	Member of Promotion and Tenure Committee
1998(Spring) - 1999	Chair, Curriculum Committee
1994(Spring) - 1997	Power Systems Representative, Curriculum Committee
1993(Fall)	Chair, Curriculum Committee
1992 - 1995	Faculty Search Committee
1992 - 1993	Distinguished Lecture Series, Chair
1991 - 1993	Professional Development Committee
1991 - 1995	Graduate Application Review Committee
1990 - 2005	Power Area Subcommittee/Energy Systems Group

## **Auburn University**

### **Department Committees**

1989-1990	Engineering Computer Group
1986-1990	EE Computer Users Group, Chair
1986-1990	Power Systems Group

## **Other**

### **Promotion and tenure review for other universities:**

College of Engineering, Texas A & M University, College Station, Texas

College of Engineering Sciences, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia

Yarmouk University, Irbid, Jordan

College of Engineering, Asian Institute of Technology, Klong Luang, Pathumthani, Thailand

### **Public Service:**

*Patron, Governing Member, and Sustaining Fellow: Art Institute of Chicago*