



**UNIVERSITY OF WASHINGTON**  
DEPARTMENT OF ELECTRICAL ENGINEERING  
SEATTLE, WASHINGTON 98195-2500

**FACULTY BIOGRAPHICAL SUPPLEMENT**

**OF**

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## **1. PERSONAL DATA**

**Name:** Mohamed A. El-Sharkawi

**Date of Birth:** April 28, 1948

**Citizenship:** USA

## **2. EDUCATIONAL RECORD**

<i>College or University</i>	<i>Dates</i>	<i>Degree</i>
Cairo High Institute of Technology	66-71	B.Sc.
University of British Columbia	75-77	M.A.Sc.
University of British Columbia	77-80	Ph.D.

## **3. PROFESSIONAL APPOINTMENTS**

### **3.a University of Washington Record**

#### **Academic Appointments**

- **Assistant Professor**, Sept. 16, 1980 - Sept. 15, 1985
- **Associate Professor**, Sept. 16, 1985 - Sept. 15, 1990
- **Professor**, Sept. 16, 1990 - Present

#### **Administrative Appointments**

- **Graduate Program Coordinator**, 1993-1996
- **Associate Chair**, 1996-1998
- **Associate Chair for Academics and Curriculum**, 1998-1999
- **Member of the faculty council of the College of Engineering**. 2004-present
- **Faculty Senator**: 1992-1994 and 2005-2006

### **3.b Consulting and Professional Practice**

#### **Engineering Program Evaluator**

- **Electrical Engineering Program**, Abu Dhabi University, UAE, 2009
- **Mechatronics engineering program**, the American University in Sharja, UAE, 2006.
- **Graduate program**, department of Electrical Engineering, Kuwait University, 2005.
- **Graduate program**, department of Process Control, Kuwait University, 2005.

- Electrical and Computer Engineering programs, Sultan Qaboos University, Oman, 2000, 2001, and 2002

### **Expert on Electrical Safety**

- Electric Safety Instructor and evaluator, 2004-present
- US Attorney Office, 2010
- Bruzese and Calabria. Attorneys, Steubenville, Ohio, 2009-present
- Seattle City Light, 2008-2009
- ESCOM, South Africa, 2007
- Ned Nelson, Architect, Bellevue, 2006
- Washington State WISHA, Seattle, 2001
- US Department of Labor (OSHA), Atlanta, 2001
- US Department of Labor (OSHA), Chicago, 1999-2000
- Office of the solicitor (OSHA), Seattle, 1999
- Leland E. Shields Inc, Auto Safety, Seattle, 1998.
- John G. Bergmann, Attorney and Ball-InCon Glass Packaging, Seattle, 1991

### **Expert on Power Systems, Drives and Power Electronics**

- Hawaii Electric Light Company (HELCO), 2009-present
- Consultant to Boise, Elma, Washington, 2004
- Consultant to Micro Encoder Inc. "High Performance Drives", 1996-1997
- Consultant to British Columbia Hydro, "Dynamic Security Assessment of Power Systems," 1992-1993
- Consultant to Systems Control, ABB Power Automation, Santa Clara, California. EPRI project entitled, "Power System Dynamic Security Analysis Using Artificial Intelligence Techniques. Phase I - Feasibility Evaluation", 1990 - 1992
- Patent Consultant, 1991
- Consultant to Ocean Energy and Water Inc. Mount Vernon, Washington, 1990
- Consultant to Energy International, Bellevue, Washington, 1988 and 1989.
- Consultant to Puget Sound Power and Light Company, Bellevue, Washington, 1981-1983, 1989-1990.
- Consultant on a foreign research project entitled, "Control of Active and Reactive Power Flow in the Egyptian Network with Security Constraints - Special Reference to Talkha Zone," Egyptian Foreign Relations Co-ordination Unit of the Supreme Council of Universities, 1985-1987.

#### **4. HONOR AND AWARDS**

- Elected to **Fellow of IEEE** in 1994, **Citation:** for contribution to the application of neural networks to power system analysis.
- **IEEE Distinguished Speaker**, IEEE- Computational Intelligence Society, 2002-present
- Sigma Xi
- Listed in Who is Who in Technology Today
- Listed in American Men and Women of Science
- Listed in Men of Achievement
- Listed in the International Directory of Distinguished Leadership

#### **5. TEACHING**

##### **5.a Courses Taught and Teaching Ratings**

**Course Topics:** Electric Energy, Renewable Energy, Electric Safety, Intelligent Systems and Applications, Power Electronics, Power Quality, Energy transmission, Power System Analysis, Distribution Systems, Electric Circuits, Dynamics & Control of Power Systems, Transient Analysis of Power System, Elements of Electrical Engineering, Advanced Electric Drives, Independent Studies, independent Research, and Special Projects.

##### **5.b Textbooks or Curriculum Authored**

1. **M. A. El-Sharkawi**, "Electric Energy: An Introduction," Textbook published by CRC press, 2004. ***The book is the text used in EE351***
2. **M. A. El-Sharkawi**, "Electric Energy: An Introduction, Second Edition" Completely renovated text published by CRC press in 2008.
3. **M. A. El-Sharkawi**, "Fundamentals of Electric Drives," Textbook published by PWS-Brooks/Cole Pub. Company, 2000. ***The book is the text used in EE453.***
4. Kwang Lee and **M. A. El-Sharkawi**, "Modern Heuristic Optimization Techniques: Theory and Applications to Power Systems," IEEE- Wiley press, 2008. ***The book is the text for EE555.***
5. **M. A. El-Sharkawi**, "Electrical Safety," In preparation and expected to be published in 2011
6. **M. A. El-Sharkawi**, "Advanced Control Techniques in High Performance Electric Drives," Analysis and Control System Techniques for Electric Power Systems, Academic Press, 1991, Volume 44, pp. 59-130. It is the main material used in EE 559 (High Performance Drives)
7. **M. A. El-Sharkawi**, R. J. Marks and Siri Weerasooriya "Neural Networks and Their Application to Power Engineering," Analysis and Control System Techniques for Electric Power Systems, Academic Press, 1991, Volume 41, pp. 359 - 461. It is a supplementary material used in EE 559 (Applications of Neural Networks to Power Systems)

8. **M. A. El-Sharkawi** and R. J. Marks, editors, "Applications of Neural Networks to Power Systems," IEEE press, 1991, Catalog Number 91TH0374-9. It is a supplementary material used in EE 559 (Applications of Neural Networks to Power Systems)
9. **M. A. El-Sharkawi** and Dagmar Niebur Editors, "*Application of Artificial Neural Networks to Power Systems*," IEEE press, 96 TP 112-0, 1996.

### **5.c Courses Improvement/Development**

- Introduced EE 551: Renewable Energy
- Introduced EE 599: Electric Safety
- Introduced EE 453: Electric Drives, with its laboratory. Wrote a textbook for this class and introduced multi-media instruction.
- Restructuring EE 351. Wrote a textbook for this class and introduced multi-media instruction
- Introduced EE 555: Fundamentals of Intelligent Systems. Wrote a textbook for this class and introduced multi-media instruction
- Introduced EE 559 A: Power Quality.
- Introduced EE 559 B: Electromagnetic Transients in Power Systems.
- Introduced EE 552: Power System Dynamics and Control.
- Introduced EE 559 C: Advanced Electric Drives.
- Introduced EE 559: Applications of Neural Networks to Power Systems
- Designed the Energy Laboratory twice.
- Designed the Electric Drives Laboratory twice.
- Participated in developing sequence of courses on Power System Analysis: EE 454, EE 455, and EE 456.

## **6. RESEARCH ACTIVITIES**

### **6.a Research Areas**

- Renewable energy
- Smart grid
- Intelligent Systems and their Applications
- Application of Power Electronics to Power Systems
- Electric Drives and High Performance Tracking Controls
- Power System Dynamics and Control
- Underwater sonar mapping and tracking
- Power system infrastructure for underwater observatories
- Engineering Education

### **6.b Student Research Supervision**

**6.b.1 Chaired Doctoral Degrees**

	<b>Student Name</b>	<b><u>Dissertation Title</u></b>	<b>Date</b>
1.	M. Akherraz	Suboptimal Regulator and quadratic Tracking Techniques for Speed and Rotor Position Control of a Voltage Source Induction Motor Drive System	1987
2.	M. E. Aggoune	Power System Security Assessment Using Artificial Neural Networks	1988
3.	Mingliang Chen	Adaptive Excitation Control of Power Systems.	1989
4.	Mohamed Bahgat (Co-Supervised with Helwan University)	Dynamic Equivalent Load Models for Power Systems	1989
5.	Mohamed Moursy (Co-Supervised with Helwan University)	Variable Structure Tracking for Induction Machines	1989
6.	Siri Weerasooriya	Application of Neural Networks for Classification and System Identification in Power Systems	1992
7.	S. S. Huang	Intelligent Systems Application to Security Assessment	1994
8.	Mohamed El-Samahi (Co-Supervised with Helwan university)	High Performance Brushless Motor Drives	1992
9.	Amal Mohamed (Co-Supervised with Egyptian research institute)	Neural Network Applications to Drives	1995
10.	Amol Kulkarni	Application of Computational Intelligence to High Performance Electric Drives	1999
11.	Creg Jensen	Application of Computational Intelligence to Power System Security Assessment	1999
12.	Min Goo Kim	Application of Computational Intelligence to Power System Vulnerability Assessment and Adaptive Protection using High-Speed Communication	2002
13.	Ioannis Kassabalides	Applications of biologically-inspired algorithms to complex systems	2002
14.	Benjamin Thompson (co supervised with Robert J. Marks)	Computational Intelligence for Sonar Mapping and Detection	2004
15.	Simon P. Teeuwsen (Co Supervised with Dr. Erlich from Duisburg)	Oscillatory Stability Assessment of Power Systems using Computational Intelligence	2005
16.	Han Yan	Power System Encoder	2006



17	Lu Shuai	NEPTUNE Power System for Underwater Observatory	2007
18	David Krout (co supervised with Robert J. Marks)	Intelligent Ping Sequencing for Multiple Target Tracking in Distributed Sensor Fields	2007
19	Patrick Ngatchou N.	Intelligent Techniques for Modeling and Optimization	2007
20	Anahita Zarei	Classification, Detection and prediction of Dentoalveolar Improvements	2007
21	Ali Al-Awami	Wind Energy Integration	Expected 2010
22	Eric Sortomme	Electric Vehicle for Energy Regulation	Expected 2011
23	Dong Eok Kim	Wind Energy Systems Modeling	Expected 2012

### **6.b.2 Chaired Master Degrees**

	<b>Student Name</b>	<b>Thesis Title</b>	<b>Date</b>
1.	John A. Bakken	Eigenvalue-Sensitivity Analysis for Dynamic Equivalent Systems	1982
2.	Brian J. Brewer	Power System Dynamic Stabilization Using Linear Optimal Control	1983
3.	Timothy J. Williams	Adaptive Reactive Power Compensator for Wind Generators	1983
4.	Fang Shi	Design and Evaluation of Electronically Commutated DC Motors	1983
5.	Mohamed E. Aggoune	Dynamic Equivalent Load Model for Power Systems	1984
6.	Subramanian V. Vadari	SPICE Simulation of Equivalent Model of Adaptive Power Factor Controller	1986
7.	James S. Coleman	Microprocessor-Based Electronically Commutated DC Machines	1986
8.	Mingliang Chen	Microprocessor-Based Adaptive Power Factor Controller	1986
9.	Zhi Li	Control of Electronically Commutated dc Motor by Optical Encoders	1987
10.	Greg Fissel	Linear Optimal Tracking Technique of dc Motors for Robotics Application	1988
11.	Siri Weerasooriya	Development and Implementation of Self-Tuning Tracking Controller for High Performance DC Drives	1988

12.	Tony Huang	Laboratory Setup for Instruction and Research in Electric Drives Control	1989
13.	Brigit Koeppen	Adaptive Control for Induction Motor Drives.	1989
14.	Ralf Seliger	Robust Vector Control Drive System	1989
15.	Lee Silberkliet	Design, Construction and Testing of a 15-kV Class Solid State Switch for Capacitor Compensation	1990
16.	Marc Gottshall	Variable Structure Tracking Control of Brushless Motors	1990
17.	David Shroyer	Laboratory Setup for Research in Brushless dc Motor Control	1990
18.	Steven A. Hendrickson	Microcomputer Control of Brushless Machines for Navigation	1996
19.	Adam Szorfan	Adaptive Flicker Controller	1994
20.	Michael Dong	A Prototype Adaptive VAR Compensator for Ungrounded Loads	1995
21.	Christopher Severns	Neural Network Supervised Adaptive Reclosing for Reducing transient Tensional Stresses of Turbine-Power Quality	1995
22.	Navjeet Gill		1999
23.	Peng Peng	Intelligent System Load Forecasting	1998
24.	Bing Wu	Failure Detection of Turboalternators using Intelligent Systems	1999
25.	Shaik Sadiq	Precision Control of Elastic Systems	2000
26.	Yonghong Guo	Intelligent Control for Elastic Systems	2000
27.	Uday Gandikota	High Performance Electric Drives	2001
29.	Amir Kazemini	Intelligent Control	2002
30.	Simon P. Teeuwsen (Co Supervised with	Security Assessment of European Power Network	2001
31.	Tobias Mann	Computational Intelligence for Sonar Mapping	2002
32.	Aditya Upadhye	Neptune dc Circuit Breaker	2003

33	Judy Linkhart	Power System Safety	2004
34	Sean Slastuka	Swarm Control for Underwater Vehicles	2008
35	Eric Rust	Intelligent Sonar Optimization	2007

### **6.b.3 Visiting Scholars**

	<b><u>Name</u></b>	<b><u>Research Subject</u></b>	<b><u>Dates</u></b>
1.	Daishing Pei	Adaptive Power Factor Controller	1984-1986
2.	M. Moursy	Variable Structure Tracking for Induction Machines	1987 – 1989
3.	M. Bahgat	Dynamic Equivalent Load Models for Power Systems	1987 – 1989
4.	M. El-Samahi	High Performance Brushless Motor Drives	1990-1992
5.	Shi-Mo Wang	Neural Networks for Power Systems	1993-1994
6.	A. Mohamed	Neural Network Applications to Drives	1994-1995
7.	Ichiro Miki	Electric Drives	1994
8.	Emir Dizonovic	Adaptive Control	1994-1995
9.	M. Zayan	Neural Network Application to Power System	1995, 1996
10	A. Al-Naamany	Intelligent Systems	1998-1999
11	S. Al-Alawi	Intelligent Systems	1999
12	Simon Teeuwsen	Security Assessment of Power Systems	2001, 2003, 2004
13	Eel-Hwan Kim	Electric Drives	2004
14	M. Boudor	Intelligent Systems	2005-06

## 6.c Publications

### **6.c.1 Refereed Archival Journal Articles**

1. Yao-nan Yu, **M. A. El-Sharkawi** and M. Wvong, "Estimation of Unknown Large Power System Dynamics," IEEE Transactions on Power Apparatus and Systems, pp. 279-289, Jan./Feb. 1979.
2. Yao-Nan Yu and **M. A. El-Sharkawi**, "Estimation of External Dynamic Equivalents of a Thirteen-Machine System," IEEE Transactions on Power Apparatus and Systems, pp. 1324-1332, March 1981.
3. **M. A. El-Sharkawi**, "Choice of Model and Topology for External Equivalent Systems," IEEE Transactions on Power Apparatus and Systems, pp. 3761-3768, December 1983.
4. **M. A. El-Sharkawi**, "Low-Order Valid Models for Dynamic Studies of Multi-Machine Power Systems," Canadian Electrical Engineering Journal, pp. 35-42, January 1984.
5. R. Ramaswami, S. S. Venkata, and **M. A. El-Sharkawi**, "Six-Phase Transmission System: Capacitance Switching," IEEE Transactions on Power Apparatus and Systems, pp.3681-3687, December 1984.
6. **M. A. El-Sharkawi**, S. S. Venkata, T. J. Williams and N. G. Butler, "An Adaptive Power Factor Controller for Three-Phase Induction Generators," IEEE Transactions on Power Apparatus and Systems, pp. 1825-1831, July 1985.
7. **M. A. El-Sharkawi** and Brian J. Brewer, "Excitation Control Design of Local Machines in a Large-Scale Power System by Using Dynamic Equivalencing Technique," Journal of Electrical Power and Energy Systems, pp. 165-174, July 1985.
8. R. Natarajan, S. S. Venkata, **M. A. El-Sharkawi** and N. G. Butler, "Economic Feasibility Analysis of Intermediate-Size Wind Electric Energy Conversion Systems Employing Induction Generators," IATED Transactions on Energy Systems, Vol 7, Number 2, pp 90-94, 1987.
9. **M. A. El-Sharkawi** and M. E. Aggoune, "Dynamic Equivalent Load Model for Power System Studies," Journal of Electrical Power and Energy Systems, pp.141-148, July 1987.
10. **M. A. El-Sharkawi**, S. S. Venkata, S. V. Vadari, M. L. Chen, N. G. Butler and R. W. Yinger, "Development and Field Testing of an Adaptive Power Factor Controller," IEEE Transactions on Energy Conversion, pp.520-525, Dec 1987.
11. R. Natarajan, S. S. Venkata, **M. A. El-Sharkawi**, and N. G. Butler, "Estimation of Energy Components of Intermediate-size Wind Electric Energy Conversion Systems Employing Induction Generators," IATED Transactions on Energy Systems, Vol 8, Number 2, pp 91-95, 1988.
12. **M. A. El-Sharkawi**, M. Chen, S. Vadari, G. Fissel, S. S. Venkata, N. Butler and R. Yinger, "Development and Field Testing of a Closed-Loop Adaptive Power Factor Controller," IEEE Transactions on Energy Conversion, pp.235-240, June 1988.
13. **M. A. El-Sharkawi** and M. Akherraz, "Tracking Control Technique for Induction Motors," IEEE Transactions on Energy Conversion, pp. 81-87, March 1989.

14. S. Weerasooriya and **M. A. El-Sharkawi**, "Adaptive Tracking Control for High Performance dc Drives," IEEE Transactions on Energy Conversion, pp. 502-508, Sept. 1989.
15. **M. A. El-Sharkawi** and C. H. Huang, "Variable Structure Tracking of dc Motor for High Performance Applications," IEEE Transactions on Energy Conversion, pp. 643-650, December 1989.
16. C. H. Huang, **M. A. El-Sharkawi** and M. Chen, "Laboratory Setup for Instruction and Research in Electric Drives Control," IEEE Transactions on Power Systems, pp. 331-337, February 1990.
17. **M. A. El-Sharkawi** and S. Weerasooriya, "Development and Implementation of Self-Tuning Tracking Controller for DC Motors," IEEE Transactions on Energy Conversion, pp. 122 - 128, March 1990.
18. M. Aggoune, **M. A. El-Sharkawi**, D.C. Park, M.J. Damborg and R.J. Marks II, "Preliminary Results of Neural Networks for Security Assessment," IEEE Transactions on Power Systems, pp.890-896, May 1991.
19. Les Atlas, R. Cole, Y. Muthusamy, A. Lippman, G. Connor, D. Park, **M. A. El-Sharkawi** and R. Marks, "A Performance Comparison of Trained Multi-Layer Perceptrons and Trained Classifications Trees," Proceedings of the IEEE, pp. 1614 - 1619, October 1990.
20. **M. A. El-Sharkawi**, "Development and Implementation of High Performance Variable Structure Tracking Control for Brushless Motors," IEEE Transactions on Energy Conversion, March 1991, pp. 114-119.
21. D. C. Park, **M. A. El-Sharkawi**, R. J. Marks, L. E. Atlas and M. J. Damborg, "Electric Load Forecasting Using An Artificial Neural Network," IEEE Transactions on Power Systems, pp. 442-449, May 1991.
22. D. C. Park, **M. A. El-Sharkawi** and R. J. Marks, "Adaptively Trained Neural Network," IEEE Transactions on Neural Networks, May 91, pp. 334-345.
23. S. Weerasooriya, **M. A. El-Sharkawi**, "Identification and Control of a dc Motor Using Back-Propagation Neural Networks," IEEE Transactions on Energy Conversion, December 1991, pp. 663-669.
24. S. Weerasooriya, **M. A. El-Sharkawi**, M. Damborg and R. Marks, "Towards Static Security Assessment of a Large Scale Power System Using Neural Networks," IEE Proceedings-C, pp.64-70, January 1992.
25. S. Weerasooriya and **M. A. El-Sharkawi**, "Laboratory Implementation of Neural Network Trajectory Controller for a dc Motor," IEEE Transactions on Energy Conversion, pp. 107-113, March 1993.
26. A. A. El-Samahy, **M. A. El-Sharkawi** and S. M. Sharaf, "Adaptive Multi-Layer Self-Tuning High Performance Tracking Control for DC Brushless Motor," IEEE Transactions on Energy Conversion, pp. 311-316, June 1994
27. **M. A. El-Sharkawi**, A. A. El-Samahy and M. L. El-Sayed, "High Performance Drive of DC Brushless Motors Using Neural Network," IEEE Transactions on Energy Conversion, pp. 317-322, June 1994

28. **M. A. El-Sharkawi**, R.J. Marks, S. Oh, S.J. Huang, I. Kerszenbaum and A. Rodriguez, "Localization of Winding Shorts Using Fuzzified Neural Networks," IEEE Transactions on Energy Conversion, pp. 140-146, March 1995.
29. **M. A. El-Sharkawi**, A. Szofran, T. Huang, G. Andexler, M. Dong, S.S. Venkata, A. Rodriguez, N. Butler, A. Van Leuven and D. Smith, "Development and Field Testing of an Adaptive Flicker Controller for 15-kV Systems," IEEE Transactions on Power Delivery, pp 1025-1030, April 1995
30. R. A. Kagalwala, S.S. Venkata, **M. A. El-Sharkawi**, N.G. Butler, A. Vanleuven, A. P. Rodriguez, I. Kerszenbaum, and D. Smith, "Transient Analysis of Distribution Class Adaptive VAR Compensators: Simulation and Field Test Results," IEEE Transactions on Power Delivery, pp 1119-1125, April 1995
31. **M. A. El-Sharkawi**, T. Huang, A. Szofran, G. Andexler, M. Dong, S.S. Venkata, N. Butler, A. Rodriguez, and I. Kerszenbaum, "Field Installation and Modifications of a 5-kV Class Adaptive Var Compensator," IEEE Transactions on Power Delivery, pp 1987-1993, October 1995
32. **M. A. El-Sharkawi**, M. Dong, T. Huang, A. Szofran, G. Andexler, S.S. Venkata, N. Butler, A. Rodriguez, and I. Kerszenbaum, "Development and Field Testing of a 15-kV Class Adaptive Var Compensator," IEEE Transactions on Power Delivery, pp 1979-1986, October 1995
33. "Artificial Neural Networks for Power Systems," CIGRE ELECTRA, **Invited Expert** on Paper by CIGRE Task Force 38.06.06, in print
34. T. C. Huang and **M. A. El-Sharkawi**, "High Performance Speed and Position Tracking of Induction Motors Using Multi-Layer Fuzzy Control," IEEE Transactions on Energy Conversion, pp. 353-358, June 1996.
35. J. Streifel, R. J. Marks, **M. A. El-Sharkawi** and I. Kerszenbaum, "Detection of Shorted Turns in the Field Winding of Turbine Generator Rotors Using Novelty Detectors - Development and Field Test," IEEE Transactions on Energy Conversion, pp. 312-317, June 1996.
36. M. Akiyama, K. Kobayashi, I. Miki, and **M. A. El-Sharkawi**, "Auto-Tuning Method for Vector Controlled Induction Motor Drives," The Transactions of the IEE of Japan, pp.844-851, Volume 116-D, No. 8, 1996.
37. Yakout Mansour, Ebrahim Vaahedi, A.Y. Chang, B.R. Corns, Jeyant Tamby and **M. A. El-Sharkawi**, "Large Scale Dynamic Security Screening and Ranking Using Neural Networks," IEEE Transactions on Power Systems, pp. 954 – 960, May 1997.
38. **M. A. El-Sharkawi**, "Neural Networks' Power: How they Help in Electric Load Forecasting and Security Assessment," IEEE Potentials, pp. 12-15, December 1996 / January 1997.
39. Yakout Mansour, Ebrahim Vaahedi and **M. A. El-Sharkawi**, "Dynamic Security Contingency Screening and Ranking Using Neural Networks," IEEE Transactions on Neural Networks, pp. 942-950, July 1997.

40. S. E. Guttormsson, R. J. Marks, **M. A. El-Sharkawi** and I. Kerszenbaum, "Elliptical Novelty Grouping for On-Line Short-Turn Detection of Excited Running Rotors," IEEE Transactions on Energy Conversion, pp. 16-22, March 1999.
41. A. S. Kulkarni, **M. A. El-Sharkawi**, R. J. Marks, and George Andexler, "Development of a Technique for On-line Detection of Shorts in Field Windings of Turbine-Generator Rotors: Circuit Design and Testing," IEEE Transactions on Energy Conversion, pp. 8-13, March 2000.
42. C. A. Jensen, R. Reed, R. J. Marks, **M. A. El-Sharkawi**, J. Jung, R. T. Miyamoto, G. M. Anderson, C. J. Eggen, "Inversion of Feedforward Neural Networks: Algorithms and Applications," Proceedings of the IEEE, pp. 1536-1549, Sept. 1999.
43. **M. A. El-Sharkawi**, Peng Peng and Robert J. Marks, "Short Term Peak Load Forecast Using a Neuro-Fuzzy regression Machine," **Invited paper**, International Journal of Engineering Intelligent Systems, pp.197-196, December 1999.
44. Craig Jensen, **M. A. El-Sharkawi**, and Robert J. Marks, "Power System Security Boundary Enhancement Using Evolutionary-Based Query Learning," **Invited paper**, International Journal of Engineering Intelligent Systems, pp.215-218, December 1999.
45. A. S. Kulkarni and **M. A. El-Sharkawi**, "Intelligent Precision Position Control of Elastic Drive Systems," IEEE Transactions on Energy Conversion, pp. 26-31, March 2001.
46. C. A. Jensen, **M. El-Sharkawi** and R. J. Marks, "Power System Security Assessment Using Neural Networks: Feature Selection Using Fisher Discrimination", IEEE Transactions on Power Systems, pp. 757-763, November 2001.
47. L.S. Moulin. A.P. da Silva, **M.A. El-Sharkawi**, and R.J. Marks, "Neural Networks and Support Vector Machine Applied to Power Systems Transient Stability Analysis," International Journal of Engineering Intelligent Systems, pp.205-212, December 2001.
48. Ioannis N. Kassabalidis, **M. A. El-Sharkawi**, R. J. Marks II, Luciano S. Moulin, and A. P. Alves da Silva, "Dynamic Security Border Identification Using Enhanced Particle Swarm Optimization," IEEE Transactions on Power Systems, pp. 723-729, August 2002.
49. George Chrysanthakopoulos, Warren L.J. Fox, Robert T. Miyamoto, Robert J. Marks II, **Mohamed A. El-Sharkawi** and Michael Healy, "A Fuzzy-Logic Autonomous Agent, Applied as a Supervisory Controller in a Simulated Environment," IEEE Transactions on Fuzzy Systems, pp 107–122, February 2004.
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105. S.P. Teeuwsen, I. Erlich, **M.A. El-Sharkawi**, "Fast Eigenvalue Assessment for Large Interconnected Powers Systems," IEEE Power Engineering Society General Meeting, San Francisco, USA, June 12-16, 2005
106. S.P. Teeuwsen, I. Erlich, **M.A. El-Sharkawi**, "Small-Signal Stability Assessment for large Power Systems using Computational Intelligence," IEEE Power Engineering Society General Meeting, San Francisco, USA, June 12-16, 2005
107. S.P. Teeuwsen, I. Erlich, **M.A. El-Sharkawi**, "Genetic Algorithm and Decision Tree based Oscillatory Stability Assessment," IEEE PowerTech conference, St. Petersburg, Russia, June 27-30, 2005
108. S.P. Teeuwsen, I. Erlich, **M.A. El-Sharkawi**, "Methods for Estimation of Counter Measures to Improve Oscillatory Stability in Power Systems", Power System Computational Conference, Liege, Belgium, August 22-26, 2005.
109. Mingoo Kim, **M. A. El-Sharkawi**, and R. J. Marks, "Vulnerability Indices For Power Systems," Intelligent Systems Applications to Power (ISAP) conference, November 6-10, 2005, Washington, DC.
110. Patrick N. Ngatchou, Warren L. J. Fox and **Mohamed A. El-Sharkawi**, "Multiobjective Multistatic Sonar Sensor Placement," IEEE World Congress on Computational Intelligence (WCCI'06), Vancouver, British Columbia, July 16-21.
111. Anahita Zarei, **Mohamed El-Sharkawi**, Michael Hairfield, and Gregory King, "An Intelligent System for Prediction of Orthodontic Treatment Outcome," IEEE World Congress on Computational Intelligence (WCCI'06), Vancouver, British Columbia, July 16-21.
112. Nissrine Krami, **Mohamed El-Sharkawi** and Mohamed Akherraz, " Multiobjective Particle Swarm Optimization Technique for Reactive Power Planning," IEEE Swarm Intelligence Symposium, Indianapolis, Indiana, May 12-14, 2006.
113. David Krout, Warren Fox, Megan Hazen and **M. A. El-Sharkawi**, "Intelligent Ping Sequencing for Multistatic Sonar Systems," International Conference on Information Fusion, Florence, Italy, July 10-13, 2006
114. **M. A. El-Sharkawi**, "First Energy Course: Beyond Electric Machinery," IEEE Power Engineering Society General Meeting, Tampa, Florida, June 24 - 28, 2007

115. **M. A. El-Sharkawi**, "Research for Sustainable Economic Development," IEEE International Conference on Communications, Computer & Power conference (ICCCP'07), Oman, February 19-21, 2007
116. Anahita Zarei, **M. A. El-Sharkawi** and Michael Hairfield, "An Intelligent System for Assessment of Orthodontic Treatment Outcome using Fuzzy Union Rule Configuration," The 18th IASTED International Conference on Modeling and Simulation, Montreal, Canada, May 30 – June 1, 2007
117. Nisrine Karimi and **M. A. El-Sharkawi**, "Pareto Multiobjective Optimization Technique for Reactive Power Planning," IEEE Power Engineering Society General meeting, Pittsburgh, PA, July 20-24, 2008.
118. A. Al-Awami and **M. A. El-Sharkawi**, "Feedback-Control-Based Optimal Power Flow for Real-Time Operation," IEEE-Power System Conference and Exhibition, Seattle, WA, March 15-18, 2009.
119. E. Sortomme and **M. A. El-Sharkawi**, "Optimal Power Flow for a System of Microgrids with Controllable Loads and Battery Storage," IEEE-Power System Conference and Exhibition, Seattle, WA, March 15-18, 2009.
120. **M. A. El-Sharkawi**, "Integration of Renewable Energy in Electrical Engineering Curriculum," IEEE-Power and Energy Society Conference, Calgary, Canada, July 26-30, 2009.
121. A. Al-Awami, E. Sortomme and **M. A. El-Sharkawi**, "Optimizing Economic/Environmental Dispatch with Wind and Thermal Units," IEEE-Power and Energy Society Conference, Calgary, Canada, July 26-30, 2009.
122. E. Sortomme, A. Al-Awami and **M. A. El-Sharkawi**, "Multi-Objective Optimization for Wind Energy Integration," IEEE PES T&D Conference & Exposition, April 20-22, 2010, New Orleans, LA, USA
123. Ram Balasubramanian, **M. A. El-Sharkawi**, R.J. Marks II, Jae-Byung Jung, R.T. Miyamoto, G.M. Andersen, C.J. Eggen, & W.L.J. Fox, "Self-Selective Clustering of Training Data Using the Maximally-Receptive Classifier/Regression Bank," Proceedings of the 2009 IEEE International Conference on Systems, Man, and Cybernetics. San Antonio, TX, USA - October 2009, pp. 4243-4249.
124. E. Sortomme, R. Irani, H. Nguyen and **M. A. El-Sharkawi**, "Estimating Energy Imbalance due to Integration of Wind Power," IEEE PES General Meeting, July 25-29, 2010, Minneapolis, MN, US
125. A. Al-Awami and **M. A. El-Sharkawi**, "Stochastic Dispatch for a Power Grid with High Penetration of Wind power," IEEE PES General Meeting, July 25-29, 2010, Minneapolis, MN, US. (best paper award)

### **6.c.3 Books and Book Chapters**

#### **Authored Textbooks**

1. **M. A. El-Sharkawi**, "Electric Energy: An Introduction," Textbook published by CRC press, 2004, ISBN: 0-8493-3078-5.
2. **M. A. El-Sharkawi**, "Electric Energy: An Introduction, Second Edition" Textbook published by CRC press, 2008, ISBN 1420062190.

3. **M. A. El-Sharkawi**, "Fundamentals of Electric Drives," Textbook published by PWS-Brooks/Cole Pub. Company, 2000, ISBN: 0534952224.
4. **M. A. El-Sharkawi**, "Electrical Safety," In preparation and expected to be published in 2011

### **Edited Research Books**

1. K.Y. Lee and **M. A. El-Sharkawi**, Editors, "Modern Heuristic Optimization Techniques: Theory and Applications to Power Systems," IEEE/Wiley, 2008, ISBN 978-0-471-45711-4
2. K.Y. Lee and **M. A. El-Sharkawi**, Editors, "Evolutionary Computation Techniques for Power System Optimization," IFAC publication, 2003.
3. K.Y. Lee and **M. A. El-Sharkawi**, Editors, "Modern Heuristic Optimization Techniques with Applications to Power Systems," IEEE tutorial book, TP-160, 2002.
4. **M. A. El-Sharkawi**, Editor in chief, "Intelligent Systems," IEEE Multi-Media CD-ROM Tutorial Series, 2000-2001.
5. **M. A. El-Sharkawi**, Editor, "Evolutionary Techniques and Fuzzy Logic in Power Systems," IEEE press, 2000 TP-142, 2000.
6. **M. A. El-Sharkawi** and R. J. Marks, editors, "Applications of Neural Networks to Power Systems," IEEE press, 1991, Catalog Number 91TH0374-9.

### **Book Chapters**

1. **M. A. El-Sharkawi**, Robert J. Marks II and Ioannis N. Kassabalidis, "Application of Evolutionary Technique to Power System Vulnerability Assessment," IEEE/John Wiley publishing, 2008
2. Patrick Ngatchou, Anahita Zarei and **M. A. El-Sharkawi**, "Pareto Multi Objective Optimization," IEEE/John Wiley publishing, 2008
3. **M. A. El-Sharkawi**, Ali Al-Awami, "Stochastic Economic/Environmental Dispatch of a Grid with High Penetration of Wind Power Using Pareto Multi-Objective Optimization," IEEE/John Wiley, to be published in 2010
4. **M. A. El-Sharkawi**, "Application of Evolutionary Technique to Power System Security Assessment," IEEE press, TP 160, 2002.
5. **M. A. El-Sharkawi**, "Evolutionary Computation and Applications - Vulnerability Assessment of Power Systems," IEEE Multi-Media Tutorial Book, Product #: EC128, ISBN 0-7803-6249-7, 2000.
6. **M. A. El-Sharkawi**, R. J. Marks II, Robert J. Streifel and I. Kerszenbaum, "Detection and Localization of Shorted Turn in the dc Field Winding of Turbine Generator Rotor Using Novelty Detection and Fuzzified Neural Networks." *Electric Power Applications of Fuzzy Systems*, Edited by M. El-Hawary, IEEE Press, 1998.

7. **M. A. El-Sharkawi**, R. J. Marks, S, Oh and C. M. Brace, "Data Partitioning for Training a Layered Perceptron to Forecast Electric Load," **Neural Networks Applications** IEEE Technology Update Series, 1996 Edited by Patrick K. Simpson. This chapter is based on the earlier publication with the same title and authors list.
8. **M. A. El-Sharkawi** and Rajasekhar Atteri, "Static Security Assessment of Power System Using Kohonen Neural Network," **Neural Networks Applications** IEEE Technology Update Series, 1996 Edited by Patrick K. Simpson. This chapter is based on the earlier publication with the same title and authors list.
9. **M. A. El-Sharkawi**, "Neural Network and its Ancillary Techniques as Applied to Power Systems" **Application of Artificial Neural Networks to Power Systems**, IEEE press, 96 TP 112-0, 1996.
10. **M. A. El-Sharkawi** and Dagmar Niebur Editors, "**Application of Artificial Neural Networks to Power Systems**," IEEE press, 96 TP 112-0, 1996.
11. **M. A. El-Sharkawi**, "Neural Network Application to Security Assessment," **Neural Networks Applications in power systems** edited by T. S. Dillon and D. Niebur CRL Publishing Ltd, 1996
12. **M. A. El-Sharkawi** and Dagmar Niebur Editors, "Applications of Neural Networks to Power Systems," IEEE Technical Activities Board Video Tutorial, 1996.
13. **M. A. El-Sharkawi**, Associate Editor, "Fuzzy Logic Technology and Applications," IEEE Press, 1994.
14. D. C. Park, **M. A. El-Sharkawi**, R. J. Marks, L. E. Atlas and M. J. Damborg, "Electric Load Forecasting Using An Artificial Neural Network," **Artificial Neural Networks: Forecasting Time Series**, IEEE Computer Society Press 1993, Edited by V. Rao Vemuri and Robert D. Rogers. This chapter is based on the earlier publication with the same title and authors list.
15. D. C. Park, **M. A. El-Sharkawi**, R. J. Marks, L. E. Atlas and M. J. Damborg, "Electric Load Forecasting Using An Artificial Neural Network," **Artificial Neural Networks: Paradigms, Applications and Hardware Implementation**, IEEE Press 1992, Edited by Edgar Sanchez-Sinencio and Clifford Lau. This chapter is based on the earlier publication with the same title and authors list.
16. **M. A. El-Sharkawi**, "Advanced Control Techniques in High Performance Electric Drives," **Analysis and Control System Techniques for Electric Power Systems**, Academic Press, 1991, Volume 44, pp. 59-130.
17. **M. A. El-Sharkawi**, R. J. Marks and Siri Weerasooriya "Neural Networks and Their Application to Power Engineering," **Analysis and Control System Techniques for Electric Power Systems**, Academic Press, 1991, Volume 41, pp. 359 - 461.
18. Les Atlas, R. Cole, Y. Muthusamy, A. Lippman, G. Connor, D. Park, **M. A. El-Sharkawi** and R. Marks, "A Performance Comparison of Trained Multi-Layer Perceptrons and Trained Classifications Trees," **Neural Networks: Theoretical Foundation and Analysis**, IEEE Press 1991, Editor Clifford Lau, This chapter is based on the earlier publication with the same title and authors list.

### **6.c.4 Technical Reports**

1. **M. A. El-Sharkawi**, "Identification of Dynamic Equivalents - Choice of Model and Topology for the External Equivalent System," United Engineering Foundation, September 1982, 110 pages.
2. **M. A. El-Sharkawi**, "Over-Voltage Protection of Underground Cables," Puget Sound Power and Light Company, April 1983, 190 pages.
3. **M. A. El-Sharkawi**, "Design and Evaluation of Electronically Commutated dc Motors," Boeing Military Airplane Company, October 1983, 145 pages.
4. S. S. Venkata and **M. A. El-Sharkawi**, "Induction Generator Wind Energy Program," Bonneville Power Administration, December 1986, 140 pages.
5. S. S. Venkata, **M. A. El-Sharkawi** and C. C. Liu, "Reactive Power Management Device Assessment," Electric Power Research Institute, EPRI No. AP-5210, August 1987, 102 pages.
6. **M. A. El-Sharkawi** and S. S. Venkata, "Adaptive VAR Controller," Bonneville Power Administration, 1994, 300 pages.
7. **M. A. El-Sharkawi**, "Solid State Switch," Southern California Edison Company, 1994, 52 pages
8. **M. A. El-Sharkawi**, S. Weerasooriya, Y. Mansour, E. Vaahedi and A. Chang, "Potential Use of Neural Network Techniques for On-Line Dynamic Security Assessment of Power Stations," Canadian Electric Authority, ST-347C-P, September 1994, 95 pages
9. **M. A. El-Sharkawi**, Y. Mansour, E. Vaahedi and A. Chang, B. Corns, C. Fuchs and J. Tamby, "On-Line Dynamic Security Assessment: Pre-Simulation Processing," Canadian Electric Authority, CEA 347T 958, May 1996, 97 pages.
10. **M. A. El-Sharkawi**, "Neural Network Application to Aircraft Electrical System," Boeing, December 1995, 70 pages
11. **M. A. El-Sharkawi** and Jiang Xing, "Adaptive Sequential Controller (ASC)," Bonneville Power Administration and Southern California Edison Company, 1996, 102 pages.
12. **M. A. El-Sharkawi** and Amol S. Kulkarni, "Elastic Link Motion Control," Micro Encoder Inc. and Washington Technology Center, 1997, 26 pages.
13. **M. A. El-Sharkawi** and R. J. Marks, "On-Line Detection of Shorts in Generator Field Windings" Electric Power Research Institute (EPRI) publication, TR-114016, 1999, 60 pages.
14. **M. A. El-Sharkawi**, "Missing Sensor Data Restoration: Computationally Intelligent Discovery of Reading Dependencies," NSF, 2007

## 6.d Patents

- 1 "Reactive Power compensating System," US Patent No. 4,677,364; June 30, 1987. The co-inventors are T. J. Williams and S. S. Venkata.
- 2 "Reactive Power compensator," US Patent No. 5,134,356; July 28,1992. The co-inventors are S.S. Venkata, George Andexler, Minglinag Chen and Tony Huang. European Patent No EP 0 528 016 B1. Canadian Patent No 2062452. German Patent Number DE 692 12 742 T2. Austrian Patent Number AT E 141 422 T1.
- 3 "High Voltage Solid State Switching Circuit," US Patent No. 5,180,963; Jan. 19, 1993. The co-inventors are George Andexler and Lee Silberkliet.
- 4 "Adaptive Sequential Controller for Power System Circuit Breakers," US Patent No. 5,361,184; Nov. 1, 1994. The co-inventors are Jian Xing, Alanso Rodriguez and Nickolas Butler.
- 5 "Adaptive Sequential Controller with Minimum Switching Energy," US Patent No. 5,644,463; July 1, 1997. The co-inventors are Jian Xing, Alanso Rodriguez and Nickolas Butler.
- 6 "Short Turn Detection of Synchronous Generator Excitation," The co-inventors are Alanso Rodriguez, Isidor Kerszenbaum, Robert Marks and Seho Oh. Patent is being prepared.

*The first three patents have been licensed to Trench Electric by the UW Office of Technology Transfer (OTT). The marketing of the fourth patent is currently in progress by the OTT.*

## 6.e Research Proposals or Grants

### 6.e.1 Current Sponsored Research

1. "Clean Energy Smart Grid Engineering," UW/WSU, \$4.5M (\$2.5M from DoE and the rest is matching from NW power industries). UW share is \$1M from DoE plus half of the matching, June 2010-June 2013., PI in UW
2. "Microgrid Platform," Advanced Power Technology, \$75K, Jan-December 2010, PI

### 6.e.3 Completed Sponsored Research

3. "Persistent Littoral Undersea Surveillance Network (PLUSNet)," Prime Office: Applied Research Laboratory, Pennsylvania State University, Subcontractors APL-UW and EE, EE share is **\$270K**, May 2004 to April-2008, PI of EE.
4. "Cooperative control of mobile vehicles," Army Research Lab, EE is subcontracted from APL, **\$12,159**, June05-August07, PI of EE.
1. "Integration of Renewable Energy: Planning visit," NSF, \$5,553, September 2006-August 2007, PI

2. "The NEPTUNE Plate-Scale Observatory: Development of a Power System for Cabled Ocean Observatories," NSF, **\$4,067K, EE dept share (El-Sharkawi's share) \$1,200K, Co-PI**, October 1, 2001-December, 2006. PI is Bruce Howe, APL. Other Co-PI are C.C. Liu, Harold Kirkham, JPL, John Delaney, UW and William Wilcock, UW.
3. "Missing Sensor Data Restoration: Computationally Intelligent Discovery of Reading Dependencies," NSF, **\$240K** (direct cost), **PI**, Sept 16, 2001 – Sept 15, 2006. (Other PI is Robert J. Marks)
4. "Development of RPC Controller" Jet propulsion Laboratory, \$20K, June 30, 2006
5. "Prediction of Orthodontic Treatment," Subcontractor with the School of Orthodontics, \$55K, Sept 04-Sept 05.
6. "MARS Cabled Submarine Observatory," National Science Foundation, Co-PI, April 1, 2004- March 31, 2005, \$725K, My share is **\$86,108**. PI is Bruce Howe from UW-
7. "Treatment of Class II Malocclusions," NIH, Co-PI, April 1, 04- June 15, 2005, EE Share is \$65K.
8. "Automated Environmentally Adaptive Sonar Control," Naval Sea Systems Command, US Navy, **\$1.21 M, (\$632 EE Share, rest is APL share), Principal Investigator**, April 3, 1999 – April, 2004. (Other PI/CO-PI are R. J. Marks, R. Miyamoto and G. Anderson).
9. "Development of Equipment and Test bed for Demonstration of Fast Switching and Tunneling in a Wireless Environment," Jet Propulsion Laboratory, **\$80K** (direct cost), **PI**, November 16, 2003-Feb1, 2005
10. "Application of Computationally Intelligent Techniques to Long-Term Multistatic Sonar Systems," Office of Naval Research, **\$690K, EE share \$203.32K**, Co-PI, Jan. 03-Dec. 05, PI is Warren Fox, UW-APL, Co-PIs are Robert Marks (EE) and Robert Miyamoto (APL).
11. "Intelligent Sensor and Satellite Networks for Earth Science and Exploration," NASA, \$825,000, UW share is **\$ 318,526**, August 16, 2000 – Dec 31 2002, **Co-PI** with R.J. Marks and Payman Arabshahi from JPL.
12. "Teaching the Application of AI to Electric Power Systems at the University of Washington," National Science Foundation, **\$243,414, Co-PI**, November 1998-October 2001. (PI: Richard Christie, Other co-PI: CC Liu and Mark Damborg).
13. "Innovative Technologies for Defense Against Catastrophic Failures of Complex, Interactive Power Networks," Electric Power Research Institute and DoD, **\$ 3,750 total, \$ 1,060 UW share, Co-PI**, Jan 1, 1999 – Dec 31 2001. (PI: CC Liu, other co-PI: M. Damborg, JN Hwang and S. Tanimoto)
14. "Environmentally Adaptive Sonar Controllers," Office of Naval Research, **\$90,000, Co-PI** with R.J. Marks and Greg Anderson from APL, Nov. 96 – Oct 99.
15. "An Intelligent Multi-Axis Elastic Link Motion Control System," Micro Encoder Inc and Washington Technology Center, **\$ 39,365 + \$ 100,000 (WTC Direct cost), Principal Investigator**, July. 16, 1998 – Dec. 15, 1999.

16. "Twin Signal Signature Sensing: Application to Shorted Winding Monitoring, Detection and Localization," National Science Foundation and Electric Power Research Institute, **\$250,000 (Direct Cost)**, **Principal Investigator**, September 1995- October 1999. (Other PI is R. J. Marks)
17. "A High Performance Elastic Motion Control System," Micro Encoder Inc and Washington Technology Center, **\$ 49,612 + \$ 30,000 (WTC Direct Cost)**, **Principal Investigator**, Sept. 16, 1996 - July 15, 1998.
18. "Initiative on Intelligent Systems Applications for Transmission and Distribution Systems," Southern California Edison Company, **\$79,530**, **Principal Investigator**, September 16, 1996 - September 15 1997. (Other PI is R. J. Marks)
19. "Under-Load Evaluation of Breaker Contacts Condition," National Science Foundation and Electric Power Research Institute, **\$50,000**, **Principal Investigator**, September 1995- Dec. 1998. (Other PI is R. J. Marks)
20. "Neural Network Technology for Aircraft Power Systems," The Boeing Company, **\$15,000**, **Principal Investigator**, November 1, 1995 - December 15, 1995.
21. "Adaptive Sequential Controller," Bonneville Power Administration, **\$233,274 (Direct Cost)**, **Principal Investigator**, Jan 1992 - Dec 1995.
22. "Adaptive Sequential Controller," Southern California Edison Company, **\$233,274 (Direct Cost)**, **Principal Investigator**, Jan 1992 - Dec 1994.
23. "Controlled Solid State Switch for Distribution Capacitors," Southern California Edison Company, **\$235,000**, **Principal Investigator**, Jan. 1, 1994-Dec. 31, 1994
24. "Travel Block Grant to Attend the Second International Forum on Applications of Neural Networks to Power Systems," National Science Foundation, **\$5,000 (Direct Cost)**, **Principal Investigator**, April 1, 1993 - March 31, 1994.
25. "Detection of Short Turns in Turbo Alternators," Southern California Edison Company, **\$174,600 (Direct Cost)**, **Principal Investigator**, August 1, 1992 - July 31, 1994. (Other PI is R. J. Marks)
26. "Installation of 15 kV AVC at Port Orford, Oregon," Bonneville Power Administration, **\$65,000**, **Principal Investigator**, Jan 1992 - Dec 1993. (Other PI is S.S. Venkata)
27. "AVC Research Program, Phase III," Southern California Edison Company and Bonneville Power Administration, **\$109,658**, **Principal Investigator**, Jan 1993 - Dec 1993. (Other PI is S.S. Venkata)
28. "Adaptive VAR Compensators for Tehachapi Wind Farms," Southern California Edison Company, **\$217,477**, **Principal Investigator**, Jan 1992 - Dec 1993. (Other PI is S.S. Venkata)
29. "Power Systems Stability and Security Assessments Using Artificial Neural Networks," National Science Foundation, **\$377,500**, **Principal Investigator**, Sept. 15, 1988 - February 28, 1992. (Other PIs are R.J. Marks, M.J. Damborg and Les Atlas).
30. "AVC Research Program, Phase II," Southern California Edison Company and Bonneville Power Administration, **\$180,000**, **Principal Investigator**, Jan 1992 - Dec 1992. (Other PI is S.S. Venkata)



31. "AVC Research Program, Phase I" Southern California Edison Company and Bonneville Power Administration, **\$360,000, Principal Investigator**, Jan 1991 - Dec 1991. (Other PI is S.S. Venkata)
32. "First International Forum on Applications of Neural Networks to Power Systems," National Science Foundation, **\$14,000, Principal Investigator**, Oct. 1, 1990 - Dec. 31, 1991..
33. "Load Forecasting Using Artificial Neural Networks," Puget Sound Power and Light Company, **\$140,000, Principal Investigator**, Sept 16, 1989 - April 30 1991. (Co-PIs are R.J. Marks, M.J. Damborg and Les Atlas).
34. "15-kV Adaptive Reactive Compensation Device (ARC) Research Program," Southern California Edison Company and Bonneville Power Administration, **\$494,820, Principal Investigator**, Jan 1990 - Dec 1990. (Other PI is S.S. Venkata)
35. "15-kV Adaptive Power Factor Controller (APFC) Research Program - Part A," Bonneville Power Administration, **\$495,000, Principal Investigator**, February 1, 1987 - December 31, 1989. (Other PI is S.S. Venkata)
36. "15-kV Adaptive Power Factor Controller (APFC) Research Program - Part B," Southern California Edison Company, **\$495,000, Principal Investigator**, January 1, 1987 - December 31, 1989. (Other PI is S.S. Venkata)
37. "Techno-Economic Evaluation of Adaptive Power Factor Controllers in Wind Power Station," Electric Power Research Institute (EPRI), **\$48,000, Principal Investigator**, September 1, 1985-April 30, 1986. (Other PIs are S.S. Venkata and C.C. Liu)
38. "Design, Fabrication and Testing of a 300-kVAR Adaptive Power Factor on a Group of Induction Generators in a Wind Farm," Southern California Edison Company, **\$268,000, Principal Investigator**, August 1, 1985- July 31, 1986. (Other PI is S.S. Venkata)
39. "Induction Generator Wind Turbine Research Program," Bonneville Power Administration, **\$625,000, Co-Principal Investigator**, October 1, 1982-September 30, 1984, **Principal Investigator**, October 1, 1984-September 30, 1986. (Other PI is S.S. Venkata)
40. "Electronically Commutated dc Machines, Phase 2," Boeing Military Airplane Company, **\$15,500, Principal Investigator**, May 16, 1984-May 15, 1985.
41. "Design and Evaluation of Electronically Commutated dc Motors," Boeing Military Airplane Company, **\$12,000, Principal Investigator**, April 1-September 30, 1983.
42. "Identification of Dynamic Equivalent - Choice of Model and Topology for the Equivalent External Power Systems," United Engineering Foundation, **\$14,000, Principal Investigator**, September 1981-August 1982.
43. "Linear Optimum Control of Multi-Machine Power Systems," Office of Engineering Research, University of Washington, **\$5,500, Principal Investigator**, January-June 1981.
44. "Equivalent Model for External Power Systems," Graduate school Research Funds, University of Washington, **\$4,024, Principal Investigator**. July-September 1981.

45. "Capital Equipment Budget-Computer Interface," Graduate School Research Funds, University of Washington, **\$8,080, Principal Investigator**, October 1980.

## **7. SERVICE ACTIVITIES**

### **7.a Professional Societies (Include Offices and Committees)**

- **Vice President for Technical Activities**, IEEE Neural Networks Council (now it is the IEEE Computational Intelligence Society), 2001 - 2003.
- **Chairman**, IEEE PES Subcommittee of Renewable Energy Machines and Systems, 2010-present
- **Founding Member**, IEEE Computational Intelligence Society
- **Member**, IEEE Awards and Recognition subcommittee, PES Education Committee, 2000-2007.
- **Secretary**, IEEE Awards and Recognition subcommittee, PES Education Committee, 2007-2008.
- **Vice President**, IEEE Awards and Recognition subcommittee, PES Education Committee, 2008-present.
- **Founder and Chairman**, IEEE-PES working group on Renewable Energy Machines and Systems, 2006-2010
- **Secretary**, IEEE PES Generation Committee, 2009-present.
- **Member**, IEEE PES working group on Fault Current Contributions from Wind Plants, 2008-present
- **Member** IEEE PES Wind Power Coordinating Committee, 2006-present.
- **Chairman**, Multi-Media Tutorials, Continuing Education Committee of the IEEE Educational Activities Board, February 1993 - 1996.
- **Editor in Chief**, Intelligent Systems, IEEE Multi-Media Tutorial Series, 2000.
- **Associate Editor**, IEEE Transactions on Neural Networks, 1991 - 1998
- **Guest Editor**, International Journal of Neurocomputing, special issue on the "Applications of Artificial Neural Networks in Power Systems," 1997-1998.
- **Associate Editor**, IEEE Technology Update Series, special issue on "Fuzzy Logic Technology and Applications," IEEE press, Catalog # 94CR0101-6, 1994.
- **Member of Editorial Advisory Board**, International Journal of Engineering Intelligent Systems, 1994 - present
- **Member** Technical Committee of the IEEE Neural Networks Council, 1993-1998.
- **Member** of the IEEE Administrative Committee of the Neural Networks Council, representing the IEEE Power Engineering Society, 1993-2001.
- **Member** Conference Committee of the IEEE Neural Networks Council, 1998-2001.

- **Member**, IEEE Power Engineering Editorial Advisory Board, 1992 - 2000.
- **Member**, IEEE Power Engineering, Power System Dynamic Performance Committee, 1998 - present.
- **Founder and Chairman**, IEEE Power Engineering Society Task Force on "Application of Neural Networks to Power Systems," 1989 - 1993.
- **Founder and Chairman**, IEEE Power Engineering Society Task Force on "Application of Intelligent Systems to Dynamic Security Assessment," 1996 - 2001.
- **Founder and Chairman**, IEEE Power Engineering Society Working Group on "Advanced Control Strategies for dc-type machines." 1991 - 2000.
- **Founder and Chairman**, Video Tutorials Committee, IEEE Council on Neural Networks, 1991 - 2000
- **Vice Chair**, IEEE Power Engineering Society Working Group on "Applications of Intelligent Computations to Power Systems," 1993-2000.
- **Member**, CIGRE Task Force 38.06.06 on "Artificial Neural Networks in Power Systems."
- **Member**, Steering Committee of the International Conference on Intelligent System Application to Power Systems, 1993-2001.
- **Member**, International Advisory Board Electrical Intelligent Systems Journal, 1994 - present.
- **Member**, Computer and Analytical Methods Subcommittee of IEEE Power Engineering Society, 1989 - 1996.
- **Member**, System Dynamic Performance Committee of IEEE Power Engineering Society, 1995 - present.
- **Member**, IEEE Electric Machinery Subcommittee, 1996 - present
- **Member**, IEEE Electric Machinery Theory Subcommittee, 1994 - present
- **Member**, IEEE Subcommittee on Direct Current, Permanent Magnet and Special Machines, 1988 - 2006.
- **Member**, IEEE Working Group on Load Forecasting, 1992 - 1997.
- **Member**, IEEE Working Group on Intelligent Systems in Station Control, 1994 - 2000.
- **Member**, IEEE Subcommittee on Station Control, 1994 - 2000.
- **Member**, the national IEEE Admission and Advancement Committee, Jan. 1985 - 1988.
- **Member**, IEEE Circuits and Systems Technical Committee on Neural Systems and Applications, 1989 - 1994.
- **Member**, IEEE Circuits and Systems Technical Committee on Power Systems and Power Electronics and Circuits, 1989 - 1996.
- **Chairman**, IEEE Student Activities Committee of the Northwest Area, Region 6, 1983 and 1984.

- **Chairman**, Student Activities Ad Hoc Committee of IEEE Power Industry Computer Applications Conference, Seattle, 1989.
- **Member**, Student Activities Ad Hoc Committee of the IEEE Power Engineering Society Summer Meeting, Seattle, 1984.
- **Member**, Engineering Institute of Canada.
- **Member**, Canadian Society for Electrical Engineering.
- **Member**, NSF Workshop on Electric Machines and Drives, Michigan State University, Oct 1988.
- **Treasurer**, IEEE Power Engineering Society, Seattle Section, 1988 - 1989.
- **Secretary**, IEEE Power Engineering Society, Seattle Section, 1989 - 1990.
- **Vice Chairman**, IEEE Power Engineering Society, Seattle Section, 1990 - 1991.
- **Chairman**, IEEE Power Engineering Society, Seattle Section, 1991 - 1992.

## 7.b University

- **Faculty Senator**, 1992-1994 and 2005-2006
- **Member**, Ad hoc Committee on Branch Campus System Engineering Curriculum Development, 1992-1993.
- **Member**, Graduate School Research Committee, 1991-1993. To evaluate proposal submitted for funding by the college of engineering faculty.
- **Member**, Ad hoc committee on conflict of interest, 1999-present

## 7.c College

- **Member**: College of Engineering Council, 2004-present
- **College of Engineering Marshal**, 1995-present
- **Program Manager**, Electrical Service Upgrade of the Electrical Engineering Building, 1985 - 1986. Fraction of full load was 20%. Tasks were: (a) To improve the electrical service in the Electrical Engineering building by installing a new distribution network. (b) To design and build a new energy and power electronics laboratory.
- **Member**, Committee II (ENGR 141), 1988 - 1989. To evaluate and update the content of ENGR 141.
- **Member**, Summer Workshop on Control Systems Curriculum of UW, 1989. To study the possibility of establishing an interdisciplinary control systems program for undergraduate and graduate teaching in the college of engineering.
- **Member**, Electrical and Computer Engineering Building Committee. To participate in the design of a new building to house the Electrical and Computer Engineering departments, 1993-1997.

- **Faculty Coordinator for Computing**, 1987 - 1991. To acquire and maintain software and hardware for teaching and research in the college of engineering.
- **Member**, Large Scale Systems Committee, 1991-1992. To develop interdisciplinary program in large scale system design.
- **Member**, Promotion and Tenure Committee (alternate member), 1993- 1996

## 7.d Department

- **Member**, Close Professorship Committee, 2007-2010
- **Member**, Faculty Promotion Committee, 2007-present
- **Director**, Electric Energy Industrial Consortium (EEIC), 2007-present
- **Chairman**, Space Committee, 2003-2006
- **Associate Chair**, 1996 – 1998
- **Associate Chair for Academics and Curriculum**, 1998 – 1999
- **Chairman**, ABET 2000 Committee, 1997-1998
- **Chairman**, Graduate Studies and Research Committee, and Graduate Program Coordinator, 1993-1996
- **Member**, Laboratory Committee of EE Department, 2000-2001
- **Member**, Research Committee of EE Department, 2000-2005
- **Member**, Curriculum Committee of EE Department, 2000-2004, 2009-present
- **Member**, Operating Committee of EE Department, 1993-1999
- **Member**, Advisory Committee of EE Department, 1996-1998
- **Member**, EE/CSE Building Committee, 1993-1997.
- **Chairman**, Ph. D. Candidacy Committee (Qualifying Exam), Spring 1992
- **Chairman**, Energy group, June 1989 - 1990.
- **Chairman**, Computer Resource Committee, 1988-1989.
- **Director**, Electric Energy Industrial Consortium (EEIC) 1986-87.
- **Chairman**, Undergraduate Admissions Committee, Spring 87.
- **Advisor**, IEEE, Student Branch, 1982-1986.
- Participated, with the other energy group members, in establishing the Electric Energy Industrial Consortium Program (EEIC) within the Department. It is a premier collaborative program with local and regional electric power-related industry that mutually benefits the Department's academic program in electric energy systems and industry's growth and development.

- **Member or Chair** of numerous *ad hoc* committee

## 7.e Outside Univesity

- **External Evaluator:** To evaluate the Mechatronics program at the American University in Sharja, UAE, 2006.
- **External Evaluator:** To evaluate the graduate program at the department of Electrical Engineering and the department of Process Control, Kuwait University, 2005.
- **External Examiner:** Accreditation examiner for the Department of Electrical Engineering of the Qaboos University in Oman, 2000, 2001 and 2002.
- **Member** of the Peer Panel on the Technical Career Program for Professional Engineers of Bonneville Power Administration, 1987 - 1989. The function of the panel is to evaluate candidates for Chief Engineer Positions, and to review individual performance of Chief Engineers for possible promotion.
- **Reviewer** of manuscripts of text books for Prentice-Hall, John Wiley and Sons, IEEE press and others
- **Reviewer,** for the National Science Foundation
- **Review Panel Member,** Several National Science Foundation initiatives
- **Lecturer and committee member,** Northwest Meter School, 1982 - 1994.

## **8. OTHER SCHOLARLY ACTIVITIES**

### **8.a Invited Lecturers and Seminars (Not listed in Other Sections)**

- “Smart Grid,” Keynote speaker, Northwest Energy System Symposium, Seattle, WA, Feb 2010.
- “Role of Smart Grid in Grid Operation,” Keynote Speaker, 14th Saudi Technical Exchange conference, Dhahran, Saudi Arabia, May 31 - June 2, 2010.
- “Smart Grid: the Future Distribution System,” *Invited Speaker*, International Symposium on Sustainable Energy ISSE’07, Tokyo, Japan, 2007
- “NEPTUNE: Under water power system,” *Invited Speaker*, FEUP, University of Porto, Portugal, 2007
- “Pareto Front,” *Invited Speaker*, INESC Porto – Instituto de Engenharia de Sistemas e Computadores do Porto, Portugal, 2007.
- “Swarm Intelligence,” *Invited Speaker*, FEUP, University of Porto, Portugal, 2007.
- “Heuristic Optimization for Power Systems,” *Invited Speaker*, POWERENG conference, Setubal, Portugal, 2007.
- “Vulnerability Assessment of Future Power Grids,” *Invited Speaker*, INESC Porto – Instituto de Engenharia de Sistemas e Computadores do Porto, Portugal, 2007.
- “Research for Sustainable Economic Development,” *Keynote Address*, IEEE International Conference on Communications, Computer & Power conference (ICCCP’07), 2007
- “Intelligent Techniques for Biomedical Applications,” *Invited Speaker*, IEEE International Conference on Communications, Computer & Power conference (ICCCP’07), 2007
- “Scientific Research Potentials in the Middle East,” *Invited Speaker*,” Bibliotheca Alexandrina, 2006.
- “Issues and Problems of Scientific Research in the Middle East,” *Invited Speaker*,” Bibliotheca Alexandrina, 2006.
- “Engineers for the 21<sup>st</sup> Century,” *Invited Speaker*,” Bibliotheca Alexandrina, 2006.
- “Worldwide Research and Development,” *Invited Speaker*, Alexandria University, 2006
- “Heuristic Optimization,” *Invited Speaker*, Helwan University, 2006
- “Applications of Intelligent Systems to Medicine,” *Invited Speaker*, Kuwait University, 2005
- “Intelligent Control,” *Invited Speaker*, Kuwait University, 2005
- “Biologically Inspired Computations,” *Invited Speaker*, Duisburg University, Germany, 2005.
- “Intelligent Systems,” *Invited Speaker*, Cairo University, Egypt 2005.

- “Engineers for the 21<sup>st</sup> Century,” *Invited Speaker*, Helwan University and Academy of Science and Technology, Egypt 2005.
- “Biologically Inspired Algorithms,” *IEEE distinguished Speaker*, St. Louis, Missouri, 2005
- “NEPTUNE power system,” *Invited Speaker*, Seattle City Light, Seattle, 10/6/2003
- “Evolutionary Optimization,” *IEEE distinguished Speaker*, Seoul, Korea, September, 2003
- “Modern heuristic optimization techniques and potential applications to power system control,” *Invited Speaker*, EPRI/NSF Workshop on Global Dynamic Optimization, Playacar, Mexico, April 10-12, 2002
- “Neptune Observatory,” *Keynote Speaker*, IEEE International Middle-East Power Conference (MEPCON), Cairo, Egypt, December 29, 2001
- “Vulnerability Assessment of Power Systems,” *Invited Speaker*, IEEE International Middle-East Power Conference (MEPCON), Cairo, Egypt, December 29, 2001
- “Role of Computational Intelligence in Machine Diagnosis,” *Keynote Speaker*, IEEE International Symposium on Diagnostics for Electrical Machines, Power Electronics and Drives, Gorizia, Italy, September 1-3, 2001
- “Biologically Inspired Algorithms,” *Keynote Speaker*, International Conference on Computers Theory and Application, ICCTA’2001, Alexandria, Egypt, August 27-30, 2001
- “Intelligent Techniques,” *Keynote Speaker*, 5th Brazilian Conference on Neural Networks, Rio de Janeiro, April 3-5, 2001
- “Vulnerability Assessment of Power Systems,” *Keynote Speaker*, The IEEE International Conference on Communication, Computer and Power –ICCCP’2001, Oman, February 12-14, 2001
- “Soft Computing for power Applications,” *Keynote Speaker*, The 25<sup>th</sup> anniversary of the establishment of the *Instituto de Investigaciones Electricas* (The institute of Electrical Research), November 24, 2000, Cuernavaca, Mexico.
- “Engineering Education 2000,” *Keynote Speaker*, The IEEE International Conference on Communication, Computer and Power –ICCCP’98, Oman, December 7-10, 1998. The talk was also given at the Academy of Science and Technology, Mansoura University and Helwan University, Egypt, during the period from Dec 11-20, 1999
- “Underwater Sonar Control,” *Keynote Speaker*, The IEEE International Conference on Communication, Computer and Power –ICCCP’98, Oman, December 7-10, 1998.
- “Trends in Intelligent Systems,” *Keynote Speaker*, Worksop on The Future of Power Electronics and Processing, Skukuza, South Africa, July 12 – 14, 1998.
- “Neural Networks and their Role in Power Engineering, including load forecasting, harmonic evaluation and detection, Power System Security assessment and fault diagnosis,” University of Durban, South Africa, July 16, 1998.



- “Selected Topics on Intelligent Systems and Applications in Control, Power and Medicine,” **Keynote Speaker**, The 1998 Large Engineering Systems Conference on Power Engineering (LESCOPE), Halifax, Nova Scotia, Canada, June 8, 1998
- “Power Engineering Education and ABET 2000,” NSF Workshop on innovations in power engineering education, Arlington, Virginia, Nov. 31, 1997.
- “Computational Intelligence Application in System Engineering,” **Keynote Speaker**, IEEE International Conference on Intelligent Applications in Communication and Power Systems (IACPS), Al-Ain, UAE, April 6-8, 1997.
- “Neural Smithing,” Physio Control, Jan 13, 1997
- “Intelligent Control for High Performance Drives,” National Electrocnics Research Institute, Cairo, Egypt, Jan 8, 1997.
- “Engineering the Computational Intelligence,” Academy of Science and Technology, Alexandria, Egypt, Jan 5, 1997.
- “Power Quality and Mitigation,” IEEE International Middle East Power Conference (MEPCON’97), Alexandria, Egypt. January 4-6, 1997.
- “Neural Network and its Applications in Power Systems,” **Keynote Speaker**, IEEE International Middle East Power Conference (MEPCON’97), Alexandria, Egypt. January 4-6, 1997.
- “Recursive, Peaks, Shapes and Typical Days Load Forecasting,” EPRI Workshop on Electric Utility Forecasting in an Era of Deregulation, November 14-15, 1996.
- “Intelligence Systems for Power Industry,” **Keynote Speaker**, Symposium of Specialists in Electric Operational and Expansion Planning, Recife, Brazil, May 20, 1996.
- “Role of Soft Computing in Power Systems,” **Keynote Speaker**, International Workshop on Soft Computing in Industry (IWSCI’96), Hokkaido, Japan, April 27, 1996
- “Ancillary Neural Network Techniques,” Southern Methodist University, February 9, 1996.
- “Neural Network Application to High Performance Drive Systems,” IEEE Industrial Electronics Conference, November 7, 1995
- “Neural Networks and its Ancillary Techniques as Applied to Power Systems,” IEE Colloquium on AI Applications in Power Systems, London, April 20, 1995
- “Neural Networks Applications to Dynamic Security Assessment,” Fuji Electric, Japan, April 11, 1995
- “Application of Neural Networks to Short Turn Detection,” Wesada University, Japan, April 10, 1995
- “Neural Network Ancillary Techniques for Power System,” Wesada University, Japan, April 10, 1995
- “Role of Neural Networks in Load Forecasting,” Tokyo Electric Power, Yokohama, Japan, April 7, 1995
- “Neural Networks Application To Power,” IEEE, Seattle, February 21, 1995

- "Adaptive Sequential Controller," IEEE, Seattle, January 19, 1995
- "Development of Neural Networks for Power Systems," IEEE Neural Networks Council Seminar at the IEEE Technical Activities Board, Phoenix, Arizona, December 4, 1992.
- "Recent Research on High Performance Drives," **Keynote Speaker**, Industrial Drives and Their Applications Conference, Seattle, March 18, 1992.
- "Role of Neural Networks in Power System Applications" NSF/EPRI Workshop on Application of Advanced Mathematics to Power Systems, San Francisco, September 4-5, 1992
- "Artificial Neural Networks Technology for Power System Applications," Toshiba Corporation, Tokyo, Japan, June 17, 1991.
- "Artificial Neural Networks Research in USA," Hitachi Research Laboratory, Hitachi City, Japan, June 18, 1991.
- "Role of Neural Networks in Electric Load Forecasting," Meiji University, Meiji, Japan, June 19, 1991.
- "Application of Artificial Neural Networks to Power System Engineering," Vancouver Section of IEEE, Vancouver, B.C., May 13, 1991.
- "Voltage Flickering due to Rapidly Varying Reactive Power," NSF workshop on Power Quality, Grand Canyon, AZ, Jan 7-8, 1991.
- "Electric Load Forecasting Using Artificial Neural Networks," University of Duisburg, West Germany, May 31, 1990.
- "Control Techniques for High Performance Electric Drives Systems," University of Duisburg, West Germany, May 30, 1990.
- "Advanced Technologies in Adaptive VAR Compensation," IEEE Power Engineering Society of Seattle, January 17, 1990.
- "Static VAR Compensation," Workshop on Recent Developments in Power Electronics Applications, Oregon Center for Advanced Technology Education, November 17, 1986.
- "Development and Field Testing of an Adaptive Power Factor Controller," IEEE Power Engineering Society of Seattle, June 1986.
- "Adaptive Power Factor Controller for Wind and Other Applications," IEEE Power Engineering Society of Seattle, May 16, 1985.
- "The Role of Dynamic Equivalents in Stability Studies," University of El-Mansoura, El-Mansoura, Egypt, December 1984.
- "Electronically Commutated dc Machines," University of Shebeen El-Koom, Shebeen El-Koom, Egypt, December 1984.
- "Current Trend in Power Electronics Research in USA," University of Helwan, Cairo, Egypt, December 1984.

- "Current Trend in Energy Research in USA," University of Helwan, Cairo, Egypt, December 1984.

## **8.b International Short Courses Taught**

Taught Webinars and Short courses through IEEE, EPRI, EUCI, AREVA, DSI, local and international Utilities since 1990

### Webinars

- Power System Stability
- Modeling of Wind Turbine Generators
- Wind Variability and Balancing Areas
- Wind Energy Reactive Power and Voltage Control
- Fault Ride-Through of Wind Power Systems
- Automatic Generation Control

### Multi-Day Courses

- Wind Energy Integration into Utility Systems
- Electric Energy Essentials
- Power Network Essentials
- Electric Safety for Utilities
- Induction Voltage Hazards Near Transmission Lines
- Grounding and Stray Voltage
- Fault Ride-Through for Wind Farms
- Power System Dynamics
- How to write a Successful Proposals and Technical Reports
- Biologically Inspired Algorithms
- Smart Grid
- Sensors Management and Reconstructions
- Modern Heuristic Optimization Techniques with Applications to Power Systems
- Intelligent Systems Applications to Machines and Control
- Neural Network Applications to Power Engineering
- Evolutionary (Intelligent) Computation Techniques
- Forecasting in a Competitive Electricity Market
- Power Quality for Transmission and Distribution
- Modern Load Forecasting for Control & Operation in the Competitive Era
- Modern short-term Electric Load Forecasting
- Artificial Neural Networks for Electric Load Forecasting

## 8.c Organization Activities of International Conferences and Forums

### **8.c.1 Major Conference Organizations:**

- **Co-Founder and Co-Chairman**, IEEE Northwest Energy Systems Symposium (NWESS), 2007, 2008 and 2009
- **Conference Chairman**, IEEE International Electric Machines and Drives Conference, Seattle, May 1999.
- **Vice General Chair** of World Congress on Computational Intelligence (WCCI'2002). This is the premium gathering of computational intelligence researchers. It features three conferences: the International Joint Conference on Neural Networks (IJCNN), the IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), and the Congress on Evolutionary Computation (CEC)
- **Finance Chair**: IEEE Symposium on Computational Intelligence, Honolulu, Hawaii, 2007.
- **Publications Chair**, 2003 IEEE International Symposium on Diagnostics for Electric Machines, Power Electronics and Drives (SDEMPED'03) conference, Atlanta, Georgia, August 24-26,2003.
- **Member**: International Program Committee (IPC) of the International Association of Science and Technology for Development (IASTED). International Conference on Neural Networks and Computational Intelligence (NCI-2003), Cancun, Mexico, May 19-21, 2003.
- **Member**: International Consulting Committee of the IEEE Middle East Power Conference (MEPCON), 2001-present.
- **Member**: International Advisory Committee of the IEEE International Conference on Industrial Electronics Technology and Automation (IETA'01), 2001.
- **Member**: International Committee of the Fifth Brazilian Conference on Neural Networks, 2001.
- **Founder** of the "International Forum on Applications of Neural Networks to Power Systems (ANNPS)" The conference is founded in 1991 and is organized in Seattle, Washington and Yokohama, Japan.
- **Co Founder** of the International Conference on "Intelligent System Applications to Power Systems (ISAP)." The conference is an integration of the ANNPS and the Expert System conference. ISAP is organized offered in France, 1994; Miami, 1996; Korea, 1997, Brazil, 1999, Hungary 2002, and Greece 2003
- **General Chairman** "First International Forum on Applications of Neural Networks to Power Systems," Seattle, Washington, 1991. The first symposium on this topic.
- **Member of Steering Committee** of the Intelligent System Applications to Power Systems Conference (ISAP), 1995-2001
- **Member of International Steering Committee** of the IEEE International Electric Machines and Drives Conference (IEMDC), 1996-present
- **Member of the Executive Committee** of the IEEE International Electric Machines and Drives Conference (IEMDC), 1997-2001
- **Member of International Steering Committee** of the IEEE International Symposium on Diagnostics for Electric Machines, Power Electronics and Drives (SDEMPED), 1997-Present

- **Member of International Steering Committee** of the IEEE International Conference on Communication, Computer and Power (ICCCP'98), 1998.
- **Member of Organizing Committee and US Liaison**, "Second International Forum on Applications of Neural Networks to Power Systems," Yokohama, Japan, April 19-22, 1993.
- **Member of Organizing Committee**, "International Conference on Intelligent System Applications to Power Systems (ISAP'96)." Orlando, Florida, January 28-February 2, 1996.
- **Member of Technical Committee**, " IEEE International Conference on Intelligent Applications in Communication and Power." Al-Ain, UAE, April 6-8, 1997.
- **Chairman of Local Arrangements**, "First IEEE Conference on Virtual Reality Technology (VRAIS)," Seattle, Washington, September 18-22, 1993.
- **Publicity Chairman**, "IEEE International Symposium on Circuits and Systems," Seattle, Washington, May 14-18, 1994

### **8.c.2 Session Chairs and Invited Panelist:**

- **Chairman and Session Organizer**, "Wind Energy Machines," IEEE Power Engineering Society Meeting, Tampa, Florida, June 24-28, 2007.
- **Chairman and Session Organizer**, "Wind Energy Installation, Operation and Compatibility," IEEE Power Engineering Society Meeting, Pittsburgh, July 20-24, 2008.
- **Panelist**: "First Course in Energy," IEEE Power Engineering Society Meeting, Tampa, Florida, June 24-28, 2007.
- **Chairman and Session Organizer**, "Applications of Neural Networks in Underwater Acoustics," International Joint Conference on Neural Networks, Portland, Oregon, July 20-24, 2003.
- **Chairman and Session Organizer**, "Advances in Electric Drives and Machines," IEEE Electric Machines and Drives Systems IEMDC'99, Seattle, May 9-12, 1999.
- **Chairman and Session Organizer**, "Intelligent Systems Application to Dynamic Security," IEEE Power Engineering Society Meeting, New York, NY, February 1-4, 1999.
- **Chairman and Session Organizer**, "Role of Neural Network in Dynamic Security Assessment," Panel Session, International Conference on Intelligent System Applications to Power Systems (ISAP'96)." Orlando, Florida, January 28-February 2, 1996.
- **Chairman and Session Organizer**, "Advancements in Intelligent Systems Technology," International Conference on Intelligent System Applications to Power Systems (ISAP'96)." Orlando, Florida, January 28-February 2, 1996.
- **Chairman and Session Organizer**, "Applications of Neural Networks to Power Systems," IEEE World Congress on Computational Intelligence; ICNN'94, June 28- July 4, 1994
- **Chairman and Session Organizer**, "Utility Applications of Neural Networks," International Conference Expert System Applications for the Electric Power Industry, Phoenix, Arizona, December 8-10, 1993
- **Chairman and Session Organizer**, "Future of Neural Networks for Power Systems," International Forum on Applications of Neural Networks to Power Systems, Yokohama, Japan, April 22, 1993
- **Chairman and Session Organizer**, "Prototype Developments of Neural Networks for Security Assessment," IEEE Power Engineering Society Meeting, Vancouver, BC, July 19-23, 1993.

- **Chairman and Session Organizer**, "Application of Artificial Neural Networks to Power Systems," International Symposium on Circuits and Systems (ISCAS'89), Portland, Or 1989. The first ever session on this topic.
- **Chairman and Session Organizer**, "Application of Artificial Neural Networks to Power Systems," International Symposium on Circuits and Systems (ISCAS'90), New Orleans, Louisiana, 1990.
- **Chairman and Session Organizer**, Special Session on "Potentials and Challenges of Artificial Neural Networks in Power System Applications," IEEE Power Engineering Society Summer Meeting, July, 1990.
- **Chairman and Session Organizer**, Special Session on "Neural Network Applications in Power System Engineering," IEEE Power Engineering Society Winter Meeting, New York, January 26-30, 1992.
- **Session Chairman**, "Identification and Control," International Conference on Intelligent System Application to Power Systems; ISAP'99, Rio de Janeiro, Brazil, April 4-8, 1999.
- **Session Chairman**, "Plant Control," International Conference on Intelligent System Application to Power Systems; ISAP'94, Montpellier, France, September 5-9, 1994.
- **Session Chairman**, "Motor Drives II," IEEE International Electric Machines and Drives Conference (IEMDC), Milwaukee, WI, May 18-21, 1997.
- **Session Chairman**, "Invited Lecture," International Conference on Intelligent System Application to Power Systems; ISAP'94, Montpellier, France, September 5-9, 1994.
- **Session Chairman**, IEEE Winter meeting of the Power Engineering Society, New York, January 1994.
- **Session Chairman**, Second Symposium on Expert Systems Applications to Power Systems, Seattle, WA, July 17 - 20, 1989.
- **Session Chairman**, NSF Workshop on Application of Artificial Neural Networks to Power Systems, Clemson, April 9-10, 1990.
- **Session Chairman**, "Applications to Power Systems," IEEE World Congress on Computational Intelligence; ICNN'94, June 28- July 4, 1994
- **Co-organizer**, Short Course on "Neural Networks and Their Application to Power Engineering," IEEE Power Industry Computer Applications Conference, Baltimore, 1991
- **Panelist**, " Intelligent Systems Applications to Electric Machines and Drives," IEEE-Power Engineering Society Meeting, Denver, Colorado, July 30, 1996.
- **Panelist**, " Intelligent Systems Applications to Electric Machines and Drives," IEEE-Power Engineering Society Winter Meeting, New York, Feb 6, 1997.
- **Panelist**, " Intelligent Systems for Electric Load Forecasting," IEEE-Power Engineering Society Meeting, New York, NY, February 1, 1995.
- **Panelist**, "Integration of Intelligent Systems into Power System Practical Applications," Panelist, IEEE-Power Engineering Society Meeting, San Francisco, CA, July 24, 28, 1994.
- **Panelist**, "Application of Intelligent Systems to Power System Generation," Panelist, IEEE-Power Engineering Society Meeting, Vancouver, BC, July 19, 23, 1993.
- **Panelist**, "The Role of Power Electronics in Power Engineering Education," IEEE Power Engineering Society, Winter Meeting, New Orleans, February 5, 1987.
- **Panelist**, "Status of Power Electronics in USA - Industry and University Viewpoints," IEEE Power Engineering Society, Summer Meeting, San Francisco, July 15, 1987.

## **8.d Work as a Referee**

- IEEE Transactions on Power Delivery
- IEEE Transactions on Power Systems
- IEEE Transactions on Energy Conversions
- IEEE Transactions on Neural Networks
- IEEE Transactions on Fuzzy Systems
- IEEE Transactions on Evolutionary Computations
- IEEE Transactions on Circuits and Systems
- IEEE Transactions on Industrial Electronics
- IEEE Transactions on Aerospace and Electronic Systems
- IEEE Transactions on Control
- International Journal of Energy Systems
- International Journal of Electric Power and Energy Systems
- Canadian Electrical Engineering Journal
- Numerous conferences
- National science Foundation proposals