

ROBERT G. OLSEN

EDUCATION

B.S.E.E. – Rutgers University 1968
M.S.E.E. – University of Colorado 1970
Ph.D. – University of Colorado 1974

EXPERIENCE

Engineer: Summer 1968
Radio WOR, New York City

Senior Engineer: 1971–1973
Westinghouse Georesearch Laboratories, Boulder, CO

NSF Faculty Fellow: February–August 1980
GTE Laboratories, Waltham, MA

Visiting Scientist: August 1984–May 1985
ASEA Research Laboratories, Västerås, Sweden

Visiting Professor: Summer 1990
Technical University of Denmark, Lyngby, Denmark

Visiting Scientist: August 1997--July
1998
Electric Power Research Institute, Palo Alto, CA

Assistant Professor: 1973–1978
School of Electrical Engineering and Computer Science
Washington State University, Pullman, WA 99164-2752

Associate Professor: 1978–1983
School of Electrical Engineering and Computer Science
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Professor: 1983–Present
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Boeing Distinguished Professor in Electrical Engineering: 1993–Present
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HONORS

- Fellow of the IEEE
- Graduated with highest honors from Rutgers
- NDEA fellowship for graduate study at University of Colorado
- Outstanding Professor (Electrical Engineering Department), 1986–87
- Research Excellence Award (College of Engineering) 1989
- IEEE Power Engineering Society Working Group Recognition Award 1989
- IEEE Spokane Section Engineer of the Year Award 1991
- IEEE Power Engineering Society Working Group Recognition Award 1992

HONORARY SOCIETIES

- Eta Kappa Nu
- Tau Beta Pi
- Sigma Xi
- Phi Kappa Phi

JOURNAL PUBLICATIONS

- [1] R. G. Olsen and D. C. Chang, "Input Impedance Change of a Half-Wave Vertical Antenna Over a Dissipative Earth," *IEEE Trans. on Antennas and Propagation*, Vol. AP-19, No. 5, pp. 685–686, September 1971.
- [2] R. G. Olsen and A. J. Farstad, "Electromagnetic Direction-Finding Experiments for Location of Trapped Miners," *IEEE Trans. on Geoscience Electronics*, Vol. GE-11, No. 4, pp. 178–185, October 1973.
- [3] R. G. Olsen and D. C. Chang, "Current Induced by a Plane Wave on a Thin Infinite Wire Near the Earth," *IEEE Trans. on Antennas and Propagation*, Vol. AP-22, No. 4, pp. 586–589, July 1974.
- [4] R. G. Olsen and D. C. Chang, "New Modal Representation of Electromagnetic Waves Supported by a Horizontal Wire Above Dissipative Earth," *Electronics Letters*, Vol. 10, No. 7, pp. 92–94, 4 April 1974.
- [5] D. C. Chang and R. G. Olsen, "Excitation of an Infinite Antenna Above a Dissipative Earth," *Radio Science*, Vol. 10, Nos. 8-9, pp. 823–832, August–September 1975.
- [6] R. G. Olsen, "A Theoretical Investigation of Microwave Irradiation of Seeds in Soil," *Journal of Microwave Power*, Vol. 10, No. 3, September 1975.
- [7] R. G. Olsen and D. C. Chang, "Analysis of Semi-Infinite and Finite Thin-Wire Antennas Above a Dissipative Earth," *Radio Science*, Vol. 11, No. 11, pp. 867–874, November 1976.

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- [8] R. G. Olsen, G. A. Geithman and D. H. Schrader, "A Microwave Irradiation Chamber for Scientific Studies on Agricultural Products," *IEEE Trans. on Microwave Theory and Techniques*, Vol. MTT-25, No. 5, pp. 428–433, May 1977.
 - [9] R. G. Olsen and M. A. Usta, "The Excitation of Current on an Infinite Horizontal Wire Above Earth by a Vertical Electric Dipole," *IEEE Trans. on Antennas and Propagation*, Vol. AP-25, No. 4, pp. 560–565, July 1977.
 - [10] E. F. Kuester, D. C. Chang and R. G. Olsen, "Modal Theory of Long Horizontal Wire Structures Above the Earth, 1, Excitation," *Radio Science*, Vol. 13, No. 4, pp. 605–613, July-August 1978.
 - [11] R. G. Olsen, E. F. Kuester and D. C. Chang, "Modal Theory of Long Horizontal Wire Structures Above the Earth, 2, Properties of Discrete Modes," *Radio Science*, Vol. 13, No. 4, pp. 615–623, July-August 1978.
 - [12] J. Daffe and R. G. Olsen, "An Integral Equation Technique for Solving Rotationally Symmetric Electrostatic Problems in Conducting and Dielectric Material," *IEEE Trans. Power Apparatus and Systems*, Vol. PAS-98, No. 5, pp. 1609–1616, September-October 1979.
 - [13] R. G. Olsen, J. Daffe and C. F. Sarkinen, "On the Origin, Significance and Minimization of Non-Uniform Contamination Along HVDC Insulator Strings," *IEEE Trans. Power Apparatus and Systems*, Vol. PAS-100, No. 3, pp. 971–980, March 1981.
 - [14] R. G. Olsen and A. Aburwein, "Current Induced on a Pair of Wires Above Earth by a Vertical Electric Dipole for Grazing Angles of Incidence," *Radio Science*, Vol. 15, No. 4, pp. 733–742, July-August 1980.
 - [15] R. G. Olsen and D. C. Chang, "Reply to 'New Representation for the Current in a Horizontal Wire Above Ground,'" *Electronics Letters*, Vol. 15, No. 18, pp. 556–557, 30 August 1979.
 - [16] R. G. Olsen and A. Aburwein, "LORAN-C Positioning Errors Caused by Scattering from Wires Above the Earth," *IEEE Trans. Electromagnetic Compatibility*, Vol. EMC-24, No. 4, pp. 381–388, November 1982.
 - [17] R. G. Olsen and T. A. Pankaskie, "On the Exact, Carson and Image Theories for Wires At or Above the Earth's Interface," *IEEE Trans. on Power Apparatus and Systems*, Vol. PAS-102, No. 3, pp. 769–774, March 1983.
 - [18] G. L. Hower, R. G. Olsen, L. D. Philipp and J. E. Staley, "A Method for Predicting the Response to Three Dimensional Defects in Eddy-Current NDE," *Materials Evaluation*, Vol. 40, pp. 1362–1366, December 1982.
 - [19] R. G. Olsen, "Radio Noise Fields Generated by Corona Streamers on a Power Line," *Radio Science*, Vol. 18, No. 3, pp. 399–408, May-June 1983.
 - [20] R. G. Olsen, "A Simple Model for Weakly Coupled Lossy Transmission Lines of Finite Length," *IEEE Trans. on Electromagnetic Compatibility*, Vol. EMC-26, pp. 79–83, May 1984.

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- [21] R. G. Olsen and K. C. Jaffa, "Electromagnetic Coupling from Power Lines and Magnetic Field Safety Analysis," *IEEE Trans. on Power Apparatus and Systems*, Vol. PAS-103, No. 12, pp. 3595–3607, December 1984.
- [22] R. G. Olsen and D. Rouseff, "On the Wave Impedance for Power Lines," *IEEE Trans. on Power Apparatus and Systems*, Vol. PAS-104, No. 3, pp. 711–717, March 1985.
- [23] R. G. Olsen and D. Rouseff, "Radio Noise Fields Generated by Corona Streamers on a Power Line Above Dissipative Earth," *Radio Science*, Vol. 20, No. 3, pp. 601–610, May-June 1985.
- [24] R. G. Olsen, "Integral Equations for Electrostatics Problems with Thin Dielectric or Conducting Layers," *IEEE Trans. on Electrical Insulation*, Vol. EI-21, No. 4, pp. 565–573, August 1986.
- [25] R. G. Olsen, "Radio Noise Due to Corona on a Multiconductor Power Line Above a Dissipative Earth," *IEEE Trans. on Power Delivery*, Vol. PWRD-3, pp. 272–287, January 1988.
- [26] R. G. Olsen and O. Einarsson, "Boundary Element Methods for Weakly Three Dimensional Quasi-Electrostatics Problems," *IEEE Trans. on Power Delivery*, Vol. PRWD-2, No. 4, pp. 1276–1284, October 1987.
- [27] R. G. Olsen, "The Magnetic Field Environment of Electric Power Lines," Invited Paper at the 1986 IEEE Winter Power Meeting (New York) in the Panel Session of Biological Effects of Power Frequency Electric and Magnetic Fields, *IEEE Special Publication 86TH0139-6 PWR*.
- [28] R. G. Olsen and B. Stimson, "Predicting VHF/UHF Electromagnetic Noise from Corona on Power Line Conductors," *IEEE Transactions on Electromagnetic Compatibility*, Vol. EMC-30, pp. 13–22, February 1988.
- [29] R. G. Olsen, G. L. Hower and P. D. Mannikko, "A Hybrid Method for Combining Quasi-Static and Full Wave Techniques for Electromagnetic Scattering Problems," *IEEE Trans. on Antennas and Propagation*, Vol. 36, pp. 1180–1184, August 1988.
- [30] R. G. Olsen and M. Wu, "High Frequency Propagation Losses on an Open Wire Transmission Line Above Dissipative Earth," *IEEE Trans. on Broadcasting*, Vol. BR-34, pp. 292–300, June 1988.
- [31] R. G. Olsen, R. S. Baishiki and D. Deno (principal authors), "Magnetic Fields from Electric Power Lines--Theory and Comparison to Measurements," *IEEE Trans. on Power Delivery*, Vol. 3, No. 4, pp. 2127–2136, October 1988.
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- [33] R. G. Olsen and P. D. Mannikko, "Validation of the Hybrid Quasi-Static/Full-Wave Method for Capacitively Loaded Thin-Wire Antennas," *IEEE Transactions on Antennas and Propagation*, Vol. 38, No. 4, pp. 516–522, April 1990.
- [34] M. Wu, R. G. Olsen and S. W. Plate, "Wideband Approximate Solutions for the Sommerfeld Integrals Arising in the Wire Over Earth Problem," *Journal of Electromagnetic Waves and Applications*, Vol. 4, No. 6, pp. 479–504, 1990.
- [35] R. G. Olsen, T. Bracken, V. Chartier, T. Dovan, K. Jaffa, M. Misakian, J. Stewart, "An Evaluation of Instrumentation Used to Measure A-C Power System Magnetic Fields," *IEEE Trans. on Power Delivery*, Vol. 6, No. 1, pp. 373–383, January 1991.
- [36] R. G. Olsen and M. Wu, "A Wideband Model for Electromagnetic Interference from Corona on Multiconductor Power Lines," *Radio Science*, Vol. 26, No. 1, pp. 73–88, January-February 1991.
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- [38] R. G. Olsen, S. D. Schennum and V. L. Chartier, "Comparison of Several Methods for Calculating Power Line Electromagnetic Interference Levels and Calibration with Long Term Data," *IEEE Transactions on Power Delivery*, Vol. 7, No. 2, pp. 903–913, April 1992.
- [39] K. Nagasawa and R. G. Olsen, "Characteristics of Dielectric Material with Holes in Region of Microwave Band," *Journal of the College of Engineering, Nihon University*, Vol. 32, pp. 129–134, March 1991.
- [40] R. G. Olsen, D. C. James and V. L. Chartier, "The Performance of Reduced Magnetic Field Power Lines: Theory and Measurements on an Operating Line," *IEEE Trans. on Power Delivery*, Vol. 8, No. 7, pp. 1430-1442, July 1993.
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- [42] G. L. Hower, R. G. Olsen, J. D. Earls and J. B. Schneider, "Inaccuracies in Numerical Calculation of Scattering Near Natural Frequencies of Penetrable Objects," *IEEE Trans. on Antennas and Propagation*, Vol. 41, pp. 982-987, July 1993.
- [43] R.G. Olsen, "Power Transmission Electromagnetics," *IEEE Antennas and Propagation Society Magazine*, Vol. 36, No. 6, pp. 7-16, December 1994
- [44] S. D. Schennum and R. G. Olsen, "A Method for Calculating Wide Band Electromagnetic Interference from Power Line Corona," *IEEE Trans. on Power Delivery*, Vol. 10, pp. 1535-1540, July 1995
- [45] R.G. Olsen, S.L. Backus and R.D. Stearns, "Development and Validation of Software for Predicting ELF Magnetic Fields Near Power Lines," *IEEE Trans. on Power Delivery*, Vol. 10, pp. 1525-1534, July 1995

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- [46] R.G. Olsen and M.C. Willis, "A Comparison of Exact and Quasi-Static Methods for Evaluating Grounding Systems at High Frequencies," *IEEE Trans. on Power Delivery*, Vol. 11, pp. 1071-1081, April 1996
- [47] M.L. Hiles, R.G. Olsen, K.C. Holte, D.R. Jensen and K.L. Griffing, "Power Frequency Magnetic field Management Using a Combination of Active and Passive Shielding Technology," *IEEE Trans. on Power Delivery*, Vol. 13, pp. 171-179, January 1998
- [48] D.B. Spencer, P.D. Pedrow, R. G. Olsen, G.V. Barbosa-Canovas and B.G. Swanson, "Space Charge Evolution in Dilute Binary Electrolytes Exposed to High Voltage Transients," *IEEE Trans. on Dielectrics and Electrical Insulation*, Vol. 3, pp. 747-753, December 1996
- [49] B.L. Qin, G.V. Barvbosa-Canovas, B.G. Swanson, P.D. Pedrow and R.G. Olsen, "Inactivating Microorganisms Using a Pulsed Electric Field Continuous Treatment System," *IEEE Trans. on Industry Applications*, Vol. IA-34, pp. 43-50, January/February 1998
- [50] R.G. Olsen and C.E. Lyon, "Modeling of Extremely Low Frequency Magnetic Field Sources Using Multipole Techniques," *IEEE Trans. on Power Delivery*, Vol. 11, pp.1563-1570, July 1996
- [51] G. Tanyer and R. G. Olsen, "High Frequency Scattering by a Conducting Circular Cylinder Coated with a Lossy Dielectric of Non Uniform Thickness," *IEEE Trans. on Antennas and Propagation*, Vol. 45, pp. 689-697, April 1997
- [52] D. H. Monteith and R. G. Olsen, "Radiation Due to a Convex Curvature Discontinuity of a Dielectric Coated Perfect Conductor," *IEEE Trans. on Antennas and Propagation*, Vol. 46, pp. 1220-1228, August 1998
- [53] R.G. Olsen, "Power Transmission Electromagnetics," *URSI Radioscientist* , No. 277, pp. 29-38, June 1996
- [54] R.G. Olsen and P. Moreno, "Some Observations about Shielding Extremely Low Frequency Magnetic Fields by Finite Width Shields," *IEEE Trans. on Electromagnetic Compatibility*, Vol. 38, pp. 460-468, August, 1996
- [55] P. Moreno and R.G. Olsen, "A Simple Theory for Optimizing Finite Width ELF Magnetic Field Shields for Minimum Dependence on Source Orientation," *IEEE Trans. on Electromagnetic Compatibility*, Vol. EMC-39, pp. 340-348, November 1997
- [56] L.L. Frasch, S. McLean and R.G. Olsen, "Electrical Properties of Dry and Water Saturated Basalt Rock, 1GHz - 100 GHz," *IEEE Trans. on Geoscience and Remote Sensing* , Vol. GRS-36, pp. 754-766, May 1998
- [57] R.G. Olsen and G.L Heins, "A Study of the Electromagnetic Compatibility of High Voltage Transmission Lines and the Guidance of Center Pivot Irrigation Units with Cornering Systems," *IEEE Trans. on Power Delivery*, Vol. PWRD-13, pp. 1230-1237, October 1998
- [58] R.E. Bruhn, P.D. Pedrow, R.G. Olsen, G. V. Barbosa-Canovas and B. G. Swanson, "Electrical Environment Surrounding Microbes Exposed to Pulsed Electric Fields," *IEEE*

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- Transactions on Dielectrics and Electrical Insulation*, Vol. 4, pp. 806-812, December 1997.
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- [60] R.G. Olsen, "An Improved Model for the Electromagnetic Compatibility of All Dielectric Self Supporting Fiber Optic Cable and High Voltage Power Lines," *IEEE Trans. on Electromagnetic Compatibility*, Vol. 41, No. 3, August, 1999, pp 180 - 192
- [61] W. Young, B. Belzer, and R.G. Olsen, "A Two Element Antenna for Null Suppression in Multipath Environments," *IEEE Transactions on Antennas and Propagation* Vol. 48, No. 8 , pp 1161-1174, August 2000
- [62] R.G. Olsen and W.T. Kaune, "Comments on 'Fields and Currents in the Organs of the Human body When Exposed to Power Lines and VLF Transmitters'" *IEEE Transactions on Biomedical Engineering*, Vol. 46, No. 6, June, 1999. pp. 760-762
- [63] M.W. Tuominen and R.G. Olsen, "Electrical Design of All-Dielectric Self-Supporting Optical Fiber Cable," *IEEE Transactions on Power Delivery*, Vol. PWRD-15, No. 3, pp. 940-947, July 2000
- [64] R.G. Olsen, J.L. Young and D.C. Chang, "Electromagnetic Wave Propagation on a Thin Wire Above Earth," *IEEE Transactions on Antennas and Propagation*, Vol. 48, pp. 1413-1419, September 2000
- [65] D.B. Phillips, R.G. Olsen and P.D. Pedrow, "Corona Onset as a Design Optimization Criterion for High voltage Electrodes," *IEEE Transactions on Dielectrics and Electrical Insulation*, Vol. TDEI-7, pp. 744-751, December 2000
- [66] K.S. Edwards, P.D. Pedrow and R.G. Olsen, "Portable ADSS Surface Contamination Meter Calibrated in a High Voltage Environment," submitted to the *IEEE Transactions on Power Delivery*
- [67] J. M. Silva and R. G. Olsen, "Use of Global Positioning System (GPS) Receivers Under Power Line Conductors," *IEEE Transactions on Power Delivery*, Vol PWRD-17, pp. xx-xx July 2002
- [68] R. G. Olsen and K. S. Edwards, "A New Method to Measure High Voltage Transmission Line Conductor Sag," *IEEE Transactions on Power Delivery*, in press
- [69] K.S. Edwards, and R. G. Olsen, "Safety Aspects of ADSS Cable Installations on High Voltage Transmission Lines," in preparation.
- [70] R.G. Olsen and D.H. Monteith, "Generalized Lumped Circuit Elements in Antenna Analysis," in preparation

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- [71] R. G. Olsen and A. P. Sakis Meliopoulos, "Personnel Grounding and Safety Issues / Solutions Related to Servicing Telecommunications Equipment Connected to Fiber Optic Cables in Optical Ground Wire (OPGW)" in preparation
 - [72] M. Istenic and R. G. Olsen "On the Accuracy of Approximate Methods for Calculating ELF Shielding Effectiveness of Infinite Planar Shields," in preparation

BOOKS AND BOOK CHAPTERS

- [1] R. G. Olsen, "Electromagnetic Characteristics of Horizontal and Vertical Wires Over a Dissipative Half-Space," Ph.D. Thesis, University of Colorado, 1974.
- [2] R. G. Olsen and D. A. Rogers, "Propagation in Optical Fibers," Published in the book *Fiber Optics*, J. Daly (Ed.), CRC Press, 1984.
- [3] R. G. Olsen and P. D. Mannikko, "Validation of the Hybrid Quasi-Static/Full-Wave Method for Capacitively Loaded Thin-Wire Antennas," Reprinted in *Computational Electromagnetics*, E.K. Miller, Medgyesi,-Mitschang and E.H. Newman (Eds.), IEEE Press, New York, 1991.
- [4] R.G. Olsen, "Power Line Electric and Magnetic Fields," McGraw Hill Yearbook of Science and Technology, pp. 167-168, 1997
- [5] D.T. Patten, O.P. Ghandi, T. Getty, W.E. Gordon, J.W. Hastings, P. Kareiva, J.C. Lin, R.G. Olsen, J. Pastor, B.J. Rathcke, A. Sastre, L.A. Shepp, "An Evaluation of the U.S. Navy's Extremely Low Frequency Communications System Ecological Monitoring Program," National Academy Press, 1997

FULL LENGTH REFEREED CONFERENCE PAPERS

- [1] R. G. Olsen, B. C. Furumasu and D. P. Hartmann, "Contamination Mechanisms for HVDC Insulators," 1977 Winter PES Symposium, New York, NY, Paper No. A 77 035-9.
- [2] R. G. Olsen and J. Daffe, "The Effect of Electric Field Modification and Wind on the HVDC Insulation Contamination Process," 1978 Winter IEEE PES Symposium, New York, NY, Paper No. A 78-120-8.
- [3] F. H. Raab and R. G. Olsen, "Detection of Loran C Anomalies Caused by Man Made Structures," Seventh Annual Wild Goose Assn. Symposium, New Orleans, LA, 1978.
- [4] R. G. Olsen and J. D. Reeves, "A Simple Model for Weakly Coupled Lossy Transmission Lines of Finite Length Located Above a Grounded Dielectric Slab," Proceedings of the 1987 IEEE EMC Meeting, Atlanta, GA, pp. 272-278.

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- [5] R. G. Olsen and V. L. Chartier, "Recent Advances in Modeling and Measurement of Electromagnetic Interference from Electric Power Lines," Invited Paper at the *1987 Study Committee 36 CIGRE Colloquium*, Montreal, Canada, June 1987.
 - [6] R. G. Olsen, "Recent Advances in Modeling and Measurement of Electromagnetic Interference from Electric Power Lines," Invited Paper at the NSF sponsored USA-Japan Seminar on the "Electromagnetic Interference in Highly Advanced Social Systems," Honolulu, HI, August 1988.
 - [7] H. L. Collins and R. G. Olsen, "One Dimensional Methods for Calculation of Fields and Ions in Wind Near an HVDC Transmission Line," Accepted by the Sixth International Symposium on High Voltage Engineering, New Orleans, LA, 1989 (withdrawn).
 - [8] N. S. Dogan, M. Wu, M. Osman and R. G. Olsen, "Modeling of Propagation and Cross-Talk in Interconnects Using SPICE," 33rd Midwest Symposium on Circuits and Systems, Calgary, Alberta, Canada, 1990.
 - [9] P. Waller, L. G. Geissinger, V. L. Chartier, and R. G. Olsen, "Electric and Magnetic Field Reduction and Research: A Report to the Washington State Legislature," Proceedings of the 1993 American Power Conference, Chicago, IL.
 - [10] R. G. Olsen, "Electromagnetic Fields from Power Lines," 1993 IEEE International Symposium on Electromagnetic Compatibility, Dallas, TX.
 - [11] J. L. Young and J. B. Schneider and R. G. Olsen, "Laplace's Equation and the Measured Equation of Invariance, 1993 COMPUMAG Conference, Miami, FL.
 - [12] R. G. Olsen, "Models for Predicting Electromagnetic Interference from Corona on Power Lines," CIGRE Conference on Power System Electromagnetic Compatibility, Lausanne, Switzerland, October 1993.
 - [13] S.G. Tanyer and R.G. Olsen, "High Frequency Scattering by a conducting Circular Cylinder Coated with a Lossy Dielectric of Non Uniform Thickness- TE Case," presented at the 1994 Applied Computational Electromagnetics Society Conference, Monterrey, CA
 - [14] D.H. Monteith and R.G. Olsen, "Radiation Due to a Convex Curvature Discontinuity of a Dielectric Coated Perfect Conductor," presented at the 1994 Applied Computational Electromagnetics Society Conference, Monterrey, CA
 - [15] S.D. Schenum and R.G. Olsen, "A Multipole Model for Coupling between Electrical Discharges and Wires," presented at the 1994 Japan U.S. Science Seminar on Electromagnetic Field Effects Caused by High Voltage Systems , Sapporo, Japan
 - [16] R.G. Olsen and V.L. Chartier, "The Performance of Reduced Magnetic Field Power Lines: Theory and Measurements on an Operating Line," presented at the 1994 Japan U.S. Science Seminar on Electromagnetic Field Effects Caused by High Voltage Systems , Sapporo, Japan
 - [17] B.L. Qin, G.V. Barvbosa-Canovas, B.G. Swanson, P.D. Pedrow and R.G. Olsen, "A Continuous Treatment System for Inactivating Microorganisms with Pulsed Electric Fields," Conference Record of the 1995 IEEE Industry Applications Annual Meeting, Orlando, FL

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- [18] P.D. Pedrow and R.G. Olsen, "Corona Streamer Onset as an Optimization Criterion for Design of High Voltage Hardware on Transmission Lines," presented at the 1995 High Voltage Workshop of the IEEE Dielectrics and Electrical Insulation Society. (also the 1996 IEEE International Symposium on Electrical Insulation)
- [19] R.G. Olsen and P. Moreno, "A Simple Method for Analyzing the Shielding of Extremely Low Frequency Magnetic Fields by Shields of Finite Extent," EMC 96' ROMA, October, 1996
- [20] R.E. Bruhn, P.D. Pedrow, R.G. Olsen, B.G. Swanson and G.V. Barbosa-Canovas, "Space Charge Near Microbes During Pulsed Electric Field Pasteurization of Liquid Foods," the 1996 IEEE International Symposium on Electrical Insulation
- [21] R.G. Olsen, D.B. Phillips and P.D. Pedrow, "Extrapolation of a Corona Streamer Onset Criterion to General Convex Conductor Surfaces," 10th International Symposium on High Voltage Engineering, Montreal, August 1997
- [22] P.D. Pedrow, D.B. Phillips, R.G. Olsen and K.S. Myers, "Trichel Pulse Statistics as a Measure of AC Corona Performance for Two Dimensional Electrode Structures in Dry Air," 10th International Symposium on High Voltage Engineering, Montreal, August 1997
- [23] P. Moreno and R.G. Olsen, "A Simple Model for Minimizing Source Orientation Dependence of Finite Width ELF Magnetic Field Shields," 10th International Symposium on High Voltage Engineering, Montreal, August 1997
- [24] R.G. Olsen, "Recent Developments in the ELF Electric and Magnetic Field Environment Issue," Invited paper at the 10th International Symposium on High Voltage Engineering, Montreal, August 1997
- [25] R.G. Olsen, "On Low Frequency Shielding of Electromagnetic Fields," Invited tutorial paper at the 10th International Symposium on High Voltage Engineering, Montreal, August 1997
- [26] R.G. Olsen, "Power Transmission Line Electromagnetic Compatibility," Invited tutorial paper at the 10th International Symposium on High Voltage Engineering, Montreal, August 1997
- [27] R.G. Olsen, "Calculations of ELF Electric and Magnetic fields in Air," Invited paper to the Dept. of Energy EMF Engineering Review Symposium, Charleston, SC April 1998
- [28] R.G. Olsen and P. Moreno, "On the Accuracy of Approximate Methods for Calculating ELF Shielding Effectiveness of Infinite Planar Shields," EMC 98' ROMA, September, 1998
- [29] R.G. Olsen and P. Moreno, "A Simple Model for Calculating Penetration of ELF Magnetic Fields Through Apertures in Planar Shields," EMC 98' ROMA, September, 1998
- [30] R.G. Olsen, "An Improved Model for Studying Dry Band Arcing on All Dielectric Self Supporting Fiber Optic Cable Located Near High Voltage Power Lines," EMC 98' ROMA, September, 1998

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- [31] W. Young, B. Belzer, and R.G. Olsen, "A Field Diversity Antenna for Portable Phones," 1998 *IEEE APS Conference on Antennas and Propagation for Wireless Communications*, November 1998
 - [32] R. Bruhn, P. Pedrow, R. Olsen, G. V. Barbosa-Canovas, and B. G. Swanson, "Electrical Charge Distribution Surrounding Microorganisms Suspended in Foods Exposed to Pulsed Electric Fields," Paper #59C-11, Institute of Food Technologists, Annual Meeting, June 20-24, 1998, Atlanta, Georgia.
 - [33] R.G. Olsen, "Laboratory Simulation of Dry Band Arcing on All-Dielectric Self-Supporting Fiber Optic Cable Near High Voltage Power Lines, presented at the 1999 IEEE EMC Society Symposium, Seattle, WA
 - [34] K.S. Edwards, P.D. Pedrow, and R.G. Olsen, "Portable ADSS Surface contamination Meter," Proceedings of the 1999 IEEE Conference on Electrical Insulation and Dielectric Phenomena, Volume I, 1999, pp. 158-161.
 - [35] K.S. Edwards, and R. G. Olsen, "Safety Aspects of ADSS Cable Installations on High Voltage Transmission Lines," North American Power Symposium, Tempe AZ, October 2002
 - [36] M. Istenic and R. G. Olsen "A Simple Hybrid Method for Calculating the Magnetic Field Shielding of 2D Conductors of Finite Width," submitted to the 15th International Zurich Symposium on EMC, February 2003
 - [37] F.M. Tesche, B.A. Renz, R.M. Hayes, and R.G. Olsen, "Development and Use of a Multiconductor Line Model for PLC Assessments," submitted to the 15th International Zurich Symposium on EMC, February 2003

BOOK REVIEWS AND NON-REVIEWED ARTICLES

- [1] R. G. Olsen, Electromagnetics at Washington State University, *IEEE Antennas and Propagation Newsletter*, Vol. 31, No. 5. pp. 13–15, October 1989.
- [2] R. G. Olsen, Review of "Advanced Engineering Electromagnetics by C. A. Balanis" *IEEE Antennas and Propagation Newsletter*, Vol. 31, No. 6, December 1989.

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- [1] R. G. Olsen and D. C. Chang, "Input Impedance Change of a Half-Wave Vertical Antenna Over a Dissipative Earth," Presented at the 1970 IEEE-GAP Symposium, Ohio State University, Columbus, OH.
- [2] R. G. Olsen and D. C. Chang, "Multi-Reflection of Current on a Long Horizontal Wire Over a Conducting Half-Space," 1971 URSI/USNC Fall Meeting, UCLA, Los Angeles, CA.
- [3] R. G. Olsen and A. J. Farstad, "Electromagnetic Direction-Finding Experiments for Location of Trapped Miners," Presented at the 1973 IEEE-GAP Symposium, University of Colorado, Boulder, CO.

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 - [5] D. C. Chang, J. R. Wait and R. G. Olsen, "Propagation Characteristics of a Horizontal Conducting Wire Located Above or Buried in the Earth," 1974 URSI/USNC Symposium, Georgia Institute of Technology, Atlanta, GA.
 - [6] R. G. Olsen, "A Theoretical Investigation of Microwave Irradiation of Seeds in Soil," presented at the Northwest Regional Meeting - AGU, Richland, WA.
 - [7] R. G. Olsen and D. C. Chang, "Analysis of Semi-Infinite and Finite Thin-Wire Antennas Above a Dissipative Earth," Presented at the 1974 URSI/USNC Symposium, Georgia Institute of Technology, Atlanta, GA.
 - [8] R. G. Olsen and D. C. Chang, "Propagation of Modes on a Pair of Infinite Wires Above a Conducting Earth," 1975 IEEE-APS Symposium, University of Illinois, Urbana, IL.
 - [9] R. G. Olsen and M. A. Usta, "The Excitation of Current on an Infinite Horizontal Wire Above Earth by a Vertical Electric Dipole," Presented at the 1976 IEEE APS Symposium, University of Massachusetts, Amherst, MA.
 - [10] G. S. Barta and R. G. Olsen, "A Short Range VLF Navigation System for Rivers and Harbors," 1977 IEEE APS Symposium, Stanford University, Palo Alto, CA.
 - [11] J. Daffe and R. G. Olsen, "An Integral Equation Technique for Solving Rotationally Symmetric Electrostatic Problems in Conducting and Dielectric Material," Presented at the 1979 Winter IEEE PES Meeting, New York, NY.
 - [12] R. G. Olsen and N.A. Sanford, "The Influence of a Borehole on the Mutual Impedance of an Array of Coplanar Loops," 1979 Spring USNC/URSI Symposium, Seattle, WA.
 - [13] R. G. Olsen, J. Daffe and C. F. Sarkinen, "On the Origin, Significance and Minimization of Non-Uniform Contamination Along HVDC Insulator Strings," Presented at the 1979 Summer IEEE PES Meeting, Vancouver, Canada.
 - [14] R. G. Olsen and A. Aburwein, "Current Induced on an Infinite Horizontal Wire Near the Earth by a Distant VED Located on the Earth's Surface," 1979 Fall USNC/URSI Symposium, Boulder, CO.
 - [15] R. G. Olsen and A. Aburwein, "Current Induced on a Pair of Wires Above Earth by a Vertical Electric Dipole for Grazing Angles of Incidence," Presented at the 1979 Fall USNC/URSI Symposium, Boulder, CO.
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 - [20] R. G. Olsen, "Radio Noise Fields Generated by Corona Streamers on a Power Line," Presented at the 1983 IEEE APS Symposium, University of Houston, Houston, TX.
 - [21] R. G. Olsen, "A Simple Model for Weakly Coupled Lossy Transmission Lines of Finite Length," Presented at the 1983 URSI/USNC Symposium, University of Houston, Houston, TX.
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 - [23] R. G. Olsen and K. C. Jaffa, "Electromagnetic Coupling from Power Lines and Magnetic Field Safety Analysis," Presented at the 1984 Winter PES Meeting, Dallas, TX.
 - [24] R. G. Olsen and D. Rouseff, "On the Wave Impedance for Power Lines," Presented at the 1984 Summer IEEE PES Meeting, Seattle, WA.
 - [25] R. G. Olsen, "Effects of Grounds," Invited Presentation in the Panel Discussion, "Grounding Practices for Mitigation of Induced Currents and Voltages," Presented at the 1984 IEEE PES Summer Meeting, Seattle, WA.
 - [26] R. G. Olsen, "Radio Noise Due to Corona on a Multiconductor Power Line Above a Dissipative Earth," Presented at the 1986 National Radio Science Meeting, Boulder, CO.
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 - [39] R. G. Olsen and B. Vanhoff, "Validation of Homogenization Theory for Calculating the Electrical Constants of Composite Materials," Presented at the 1990 National Radio Science Meeting, Boulder, CO.
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- [75] R.G. Olsen and C.E. Lyon, "Modeling of Extremely Low Frequency Magnetic Field Sources Using Multipole Techniques, Presented at the 1995 IEEE Power Engineering Society Summer Meeting, Portland, OR
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- [82] R. G. Olsen, "Technical considerations for Wideband Power Line Communication – A Summary, Presented at the 2002 IEEE Power Engineering Society Summer Meeting, Chicago, IL
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- EE 110 Introduction to Electrical Engineering
- EE 214 Design of Logic and Analog Circuits
- EE 261 Electrical Circuits I
- EE 311 Electronics
- EE 331 Electromagnetic Fields and Waves
- EE 341 Communication Systems
- EE 351 Distributed Parameter Systems
- EE 352 E.E. Laboratory I
- EE 361 Electrical Power Systems
- EE 415 Design Project Management
- EE 416 Senior Design
- EE 426 Electromagnetic Compatibility
- EE 431 UHF and Microwave Circuits
- EE 483 Wireless Communications
- EE 504 Applied Optics
- EE 516 Microwave and Optical Communications
- EE 518 Advanced Electromagnetic Theory I
- EE 519 Advanced Electromagnetic Theory II
- EE 527 Antenna Theory

PAST MASTERS DEGREE STUDENTS

- G. Geithman (1974) "An Approximate Solution to the Problem of a Lossy Dielectric Cylinder in a Rectangular Waveguide"
(to Boeing)
- B. Furumasu (1976) "Contamination Mechanisms for HVDC Insulators"

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- (to Bonneville Power Administration)
- G. Barta (1976) "River and Harbor Navigation System Using a Single Point Electromagnetic Source"
(to Tektronix Labs)
- J. Daffe (1978) "The Effect of Electric Field Modification and Wind On HVDC Insulation Contamination"
(to Kaman Sciences)
- T. Hall (1978) "A Near Real Time Scanned Acoustical Holography Reconstruction System Using the Ruticon Image Storage Device"
(to Battelle NW Laboratories)
- R. Nelson (1981) "Application of the Boundary Conditions on Total Charge in Solving Axially Symmetric, Electrostatic Problems by Means of Integral Equations"
(to ATT Bell Laboratories)
- T. Pankaskie (1981) "Electromagnetic Induction Between Power Lines and Buried Shared Right-of-Way Communications and Pipe Lines"
(to Texas Instruments Antenna Laboratory)
- A. Sharif (1982) "Scattered Electromagnetic Fields Due to Interaction Between an Infinite Horizontal Wire and an Adjacent Vertical Electric Dipole in the Presence of a Perfect Earth"
(to home country)
- B. Brim (1983) "Near Brewster Angle Scattering from Electrically Large Dielectric Cylinders"
(to University of Colorado - Ph.D.)
- M. Robert (1984) "Radio Noise Fields Generated by Corona Discharges on a Power Line"
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- J. Heaven (1984) "Microwave Amplifier Gain Bandwidth Enhancement"
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- B. Stimson (1986) "Predicting VHF/UHF Electromagnetic Noise from Corona on Power Line Conductors"
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| H. Collins | (1988) | "HVDC Transmission Line Generated Corona Behavior and Characteristics"
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| P. Mannikko | (1988) | "Validation of the Hybrid Quasi-Static/Full-Wave Method for Capacitively Loaded Thin-Wire Antennas"
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| R. Stearns | (1989) | "Electrical Environment of the Uprated NW/SW HVDC Intertie"
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| B. Vanhoff | (1989) | "Homogenization Theory for Transversely Periodic Composite Materials"
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| M. Hadwin | (1989) | "Active Voltage Probing Circuits"
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(to WSU Ph.D.) |
| D. James | (1991) | "An Evaluation of Reduced Magnetic Field Power Lines"
(to Washington Water Power) |
| S. Backus | (1993) | "Software for Power Line Magnetic Field Calculations"
(to Engineering and Design Associates) |
| M. Willis | (1994) | "Grounding System Response to High Frequency Impulses"
(to Northern Technologies) |
| Chris Lyon | (1994) | "Modeling of Magnetic Fields Generated by Low Frequency Using Multipole Techniques Sources"
(to Silicon Systems) |
| Mike Zienhert | (1995) | "A Guide for Using Multipole Techniques to Model Magnetic Fields Generated by Low Frequency Sources"
(to Vector Consulting) |
| Ken Edwards | (2000) | "Portable ADSS Surface Contamination Meter Calibrated in a High Voltage Environment,"
(to Bonneville Power Administration) |

PAST PH.D. DEGREE STUDENTS

M.A. Usta	(1979)	"Excitation of Currents on Infinite Wires by Vertical and Horizontal Electric Dipoles in the Presence of Dissipative Earth" (to faculty position in home country)
A. Aburwein	(1981)	"Interaction of Long Horizontal Wires with Vertical Electric Dipoles in the Presence of a Conducting Half-Space" (to faculty position in home country)
Mingde Wu	(1989)	"Electromagnetic Interference from Transmission Lines" (to Adaptec, Inc.)
S. Schennum	(1992)	"Electromagnetic Interference from Power Lines" (to Gonzaga University)
T. Pankaskie	(1994)	"Scattering from Surfaces Coated with Anisotropic Dielectrics" (to Boeing)
G. Tanyer	(1994)	"Electromagnetic Scattering from Cylinders Coated with Non Concentric Dielectrics" (to Ankara University in Turkey)
D. Monteith	(1996)	"Radiation Due to a Convex Curvature Discontinuity of a Dielectric Coated Perfect Conductor" (to Boeing)
P Moreno	(1997)	Low Frequency Magnetic Field Shielding (to Monterey University in Mexico)
Dave Phillips	(1998)	Optimal Design of High Voltage Electrodes (to US Navy research lab, San Diego)

FUNDED RESEARCH ACTIVITY

1973–1975	NSF Grant 40238 GK 40238 (with D. H. Schrader), "A Theoretical and Experimental Investigation of Microwave Irradiation of Plants and Seeds," funding \$50,000
1975–1976	B.P.A. Contract No. 14-03-562IN, "Study to Investigate the Phenomena Associated with Particle Deposition Caused by Electric Fields on High-Voltage Post Insulators," funding \$16,000
	WSU Research and Arts Committee Grant, "Radio Navigation Aid for Inland and Coastal Waterways," funding \$5,000
1976–1977	B.P.A. Contract No. 14-02-7003N, "Study to Further Investigate Methods to Prevent Insulator Contamination by Particle Deposition Caused by Electric Fields on High Voltage D.C. Station Post Insulators," funding \$25,000

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- 1978–1979 B.P.A. Contract DE-AC79-79B10553, "Development of Numerical Techniques and Computer Codes for Computing the Electric Potential and Field Near Two and Three Dimensional High Voltage Components," funding \$29,000
- NOAA Grant No. 04-78-B01-24, "Environmental Effects on Electrical Transmission Lines," funding \$26,000
- 1980–1981 Southern California Edison Company Contract No. C1370903, "Coupling Between Transmission Lines and Long Thin Objects Parallel to the Line," funding \$44,800
- B.P.A. Contract No. DE-AC79-80BP21837, "Further Development of Two and Three Dimensional Numerical Techniques for Computing the Electric Potential and Field," funding \$36,100
- 1981–1982 Electric Power Research Institute Contract No. RP 2025-1 (with D.H. Schrader), "Analysis of Radio Interference from Transmission Lines," funding \$50,000
- U.S. Navy Contract No. N 62583/81 M R727 (with G. L. Hower), "Computer Techniques for Antenna Insulators," funding \$7,500
- 1982–1983 B.P.A. Contract No. DE-AC79-83BP39831, "Interactive Computer Techniques for Calculating Electric Fields," funding \$32,000
- 1983–1988 Electric Power Research Institute, continuation of RP 2025-1, "Analysis of Radio Interference from Transmission Lines," funding \$207,800
- 1984 U.S. Navy Contract No. N66001-84-M-3142 (with G. L. Hower), "Proximity Effects in the Design of VLF Insulators," funding \$5,000
- 1985–1986 ASEA Research and Innovation Contract, "A Method for Solving Electrostatics Problems with Truncated Thin Layers," funding \$11,000
- 1985–1987 B.P.A. Contract No. DE-AI-85BP24408 (with P. D. Pedrow), "Modeling Techniques for Electrical Fields and Ions," funding \$138,000
- 1986 Boeing Aerospace Company Contract No. GR9341 (with G. L. Hower), "Bivariational Technique for Electromagnetic Scattering Problems," funding \$20,000
- 1986–1988 Office of Naval Research Contract No. N00014-86-K-0612, "Quasi Static Hybrid Method," funding \$100,000
- 1987–1989 Boeing Advanced Systems Company Contract No. B235002, "Scattering from Conductors Coated with Anisotropic Dielectrics," funding \$95,100.
- 1988–1990 Power Authority of the State of New York Contract No. 029234-87, "Transmission Line VHF/UHF Radio Noise Study," funding \$30,000.

1989–1990	Electric Power Research Institute, continuation of RP 2025-1, "Analysis of Radio Interference from Transmission Lines," funding \$42,200.
1989	Pacific Gas and Electric Contract No. Z12-5-674-89, "Electromagnetic Interference from Power Lines on Corridors with Multiple Circuits," funding \$10,000.
1989–1992	Boeing Advanced Systems Co. Contract No. B245389 (with G. L. Hower), "Scattering from Conductors Coated with Anisotropic Dielectrics," funding \$282,000.
1990–1993	Electric Power Research Institute, continuation of RP2025-1, "Analysis of Radio Interference from Transmission Lines," funding, \$81,985.
1990–1991	Puget Power Contract, "An Evaluation of Reduced Magnetic Field Power Lines," funding \$10,000.
1992–1993	Power Authority of the State of New York, Contract No. _____, "Transmission Line VHF/UHF Radio Noise Study," funding \$10,000.
1992–1993	Bonneville Power Administration Contract No. DE-AP79-92BP65283, "Development and Validation of Software for Predicting ELF Magnetic Fields Near Power Lines," funding \$25,000.
1993	Boeing Defense and Space Group Contract No. B245389 (with G. L. Hower and J. B. Schneider), "Scattering from Conductors Coated with Anisotropic Dielectrics," funding \$75,000.
1993–1995	Electric Power Research Institute, No. RP3148-07, Task 3, "Magnetic Field Shielding Research" funding \$127,800.
1995-1997	National Science Foundation, No. 96FG91428 - (with P. Pedrow) "Corona Streamer Onset as an Optimization Criterion for Design of High Voltage Hardware on Transmission Lines" funding \$119,000
1996-1997	Electric Power Research Institute - Low Frequency Magnetic Shielding - funding \$90,000
1996-1997	Naval Ocean Systems Center - VLF/LF Antenna Insulator Design - funding \$50,000
1997-1999	Electric Power Research Institute - Research Program Management - funding \$184,000
1999 – 2000	Avista Corp. A New Method to Measure Conductor Sag – funding \$25,000
2000 – 2001	Electric Power Research Institute – "Possible Use of the Electric Power Transmission System as a Wideband Communication System" funding \$83,000

2001 – 2002	NSF (PSERC) - Personnel Grounding and Safety Issues/Solutions Related to Servicing Telecommunications Equipment Connected to Fiber Optic Cables in Optical Ground Wire funding \$16,000
2002 – 2003	BPA Optical Isolator
2002 – 2005	Boeing High Altitude Corona

EDUCATIONAL GRANTS

1982	GTE Laboratories Contract No. GTE820629, "Industrial Undergraduate Research Participation," funding \$14,000
1991–1993	National Science Foundation, (with Y. Shamash and M. Osman), "Asian Pacific Cooperation with the University of Technology - Malaysia," funding \$100,000.

EQUIPMENT GRANTS

1981–1982	Hewlett Packard Company - Microwave Network Analysis and Spectrum Analysis Equipment, \$60,000
	Pacific Northwest Bell - Digital Communications Equipment, \$35,000
	General Telephone Company of the Northwest - Microwave Digital Communications Equipment, \$60,000
	Western Electric Company - Optical Fiber, \$3,000
1982–1983	Hewlett Packard Company - Microwave Equipment, \$15,000
	Tektronix Inc. - Optical Time Domain Reflectometer, \$17,000
1986	Hewlett Packard Company - Microwave Network Analysis Equipment, \$83,000
1989	Hewlett Packard Company - Microwave Signal Generator - \$50,000.
1991	Hewlett Packard Company - Microwave Network Analyzer - \$50,000.

PROFESSIONAL ACTIVITIES AND GOVERNMENT SERVICE (PRESENT)

USNC Representative to CIGRE Study Committee 36 (Electromagnetic Compatibility)	1998-
Associate Editor- IEEE Transactions on Electromagnetic Compatibility	1994-
IEEE Power Engineering Society AC Fields Working Group	1979
Chair	1988 – 1993
Technical Committee of the Washington State Electromagnetic Fields Task Force	1991

IEEE Power Engineering Society Corona Effects Working Group	1983 –
Chair	1993 –

IEEE 1994 Antennas and Propagation Society Symposium, Seattle, WA. Planning Committee

Member, Commission B and E of the United States National Committee of the International Union of Radio Science

Member, National Academy of Sciences Committee to Review the U.S. Navy's Extremely-Low Frequency Submarine Communication Ecological Monitoring Program (ELF)

Member, Technical Committee, EMC Roma 96', EMC Roma 98'

Member Technical Committee, Tenth International Symposium on High Voltage Engineering, Montreal, 1997

Member CIGRE Working Group 36.04

PROFESSIONAL ACTIVITIES AND GOVERNMENT SERVICE (PAST)

IEEE 1979 Antennas & Propagation Society Symposium, Seattle, WA, Technical Program Comm.

IEEE Power Engineering Society Insulator Contamination Working Group 1977-79

IEEE Power Engineering Society Magnetic Coupling Task Force 1979-83

Northwest Inductive Coordinating Council 1981-84

Academic Advisory Council of GTE Laboratories 1980-82; Vice-Chairman, 1981-82

Associate Editor-Radio Science, 1991 – 1994

REVIEWER FOR:

National Science Foundation

IEEE Electromagnetic Compatibility Society

IEEE Geoscience Electronics Society

IEEE Power Engineering Society

IEEE Antennas and Propagation Society

Radio Science

McGraw Hill Book Company

Prentice Hall

UNIVERSITY SERVICE

Graduate Studies Coordinator, Electrical Engineering Department	1980 –
Math-Engineering Liaison Committee	1974 – 1977
Reactor Safeguards Committee	1980 – 1984
Amateur Radio Club Advisor	1973 –
Research and Arts Committee (Grant-in-Aid Reviewer)	1980, 1982

Search Committee for Vice President-University Relations	1982
Search Committee for Dean, College of Engineering	1982
University Senate	1982 – 1984
University Telecommunications Study Committee	1980
Outstanding Instructor Selection Committee (University)	1983
Ad Hoc Committee on Professional Schools and the Liberal Arts	1983
Committee on Committees	1984
Research and Arts Committee	1984
University Senate Nominating Committee	1986 – 1987
Tau Beta Pi advisor	1987 – 1990
College of Engineering Research and Graduate Studies Council	1987 –
Dean Review Committee	1988 – 1989
Appeal Subcommittee of the Faculty Status Committee	1989
Office of Grant and Research Development Grant Evaluator	1989
Task Force on Graduate Education	1990
Evaluation for the Graduate Program in Physics	1991
Office of Grant and Research Development Grant Evaluator	1992
College of Engineering Tenure and Promotion Committee	1993-1995
School of EECS Executive Committee	1993-1994
Graduate Studies Committee - Vice Chair (1996-97)	1995-
Presidents Conflict of Interest Committee - Chair (1995-96)	1995-